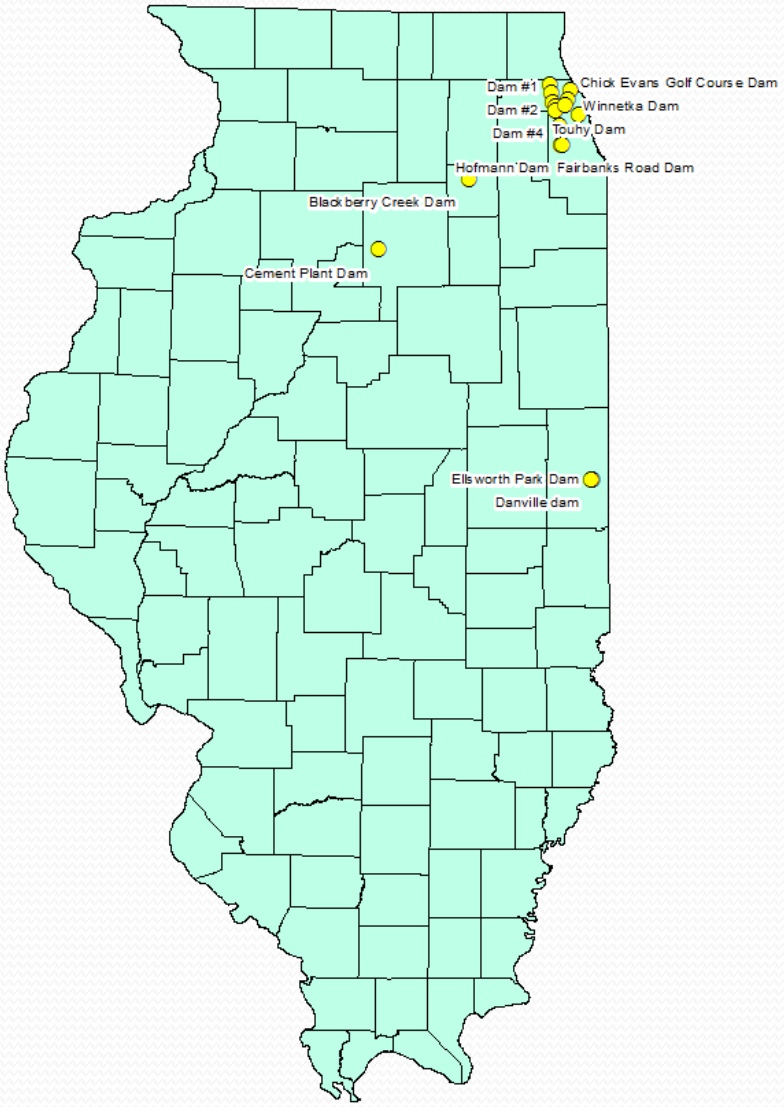
Modifications of Danville and Ellsworth Park dams

An overview of the strategic planning study

Danville Open House Meeting 4-30-2013

Governor's Dam Removal Initiative

- Removes 16 low-head dams
- All dams no longer serve original purpose
- Safer for all users of the river
- Improves water quality
- Removes aging infrastructure



Dam Removal In Illinois

Blackberry Dam - Yorkville, IL

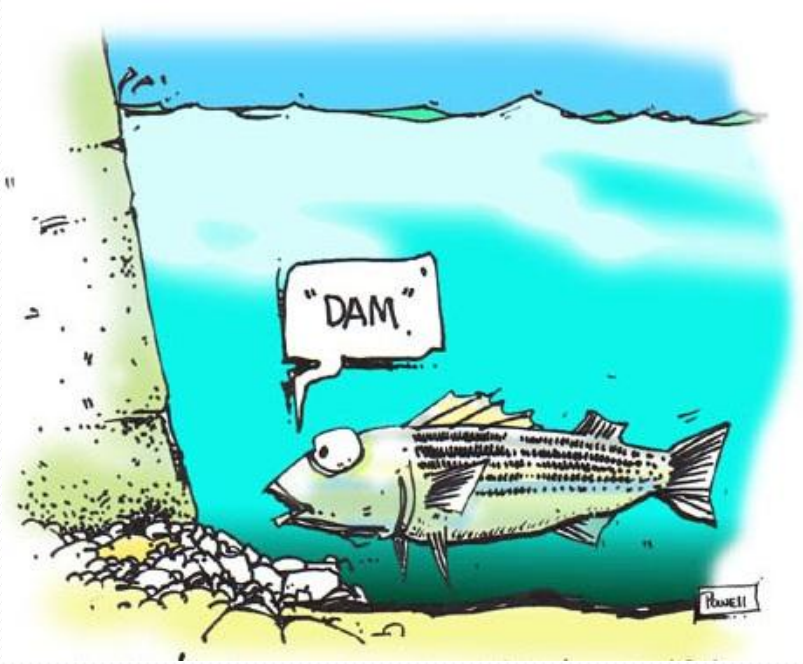
Hoffman Dam - Des Plaines, IL

Why the Study?

- Fatalities and continued deterioration at the dams
- 2004 - Mayor forms dam technical committee
- 2006 - IDNR Dam Public Safety Initiative begins
- 2007 - Evaluation of Public Safety at Run-of-River Dams published by CTE/AECOM
- 2009 – At the City's request, IDNR began a Strategic Study of Danville & Ellsworth Park Dam
- 2012 - Governor's Dam Removal Initiative announced (16 dams including Danville Dams)

Goals of this Study

- Public Safety
- Ecological Benefits / Impacts
- Improved Recreation



Public Safety Goals

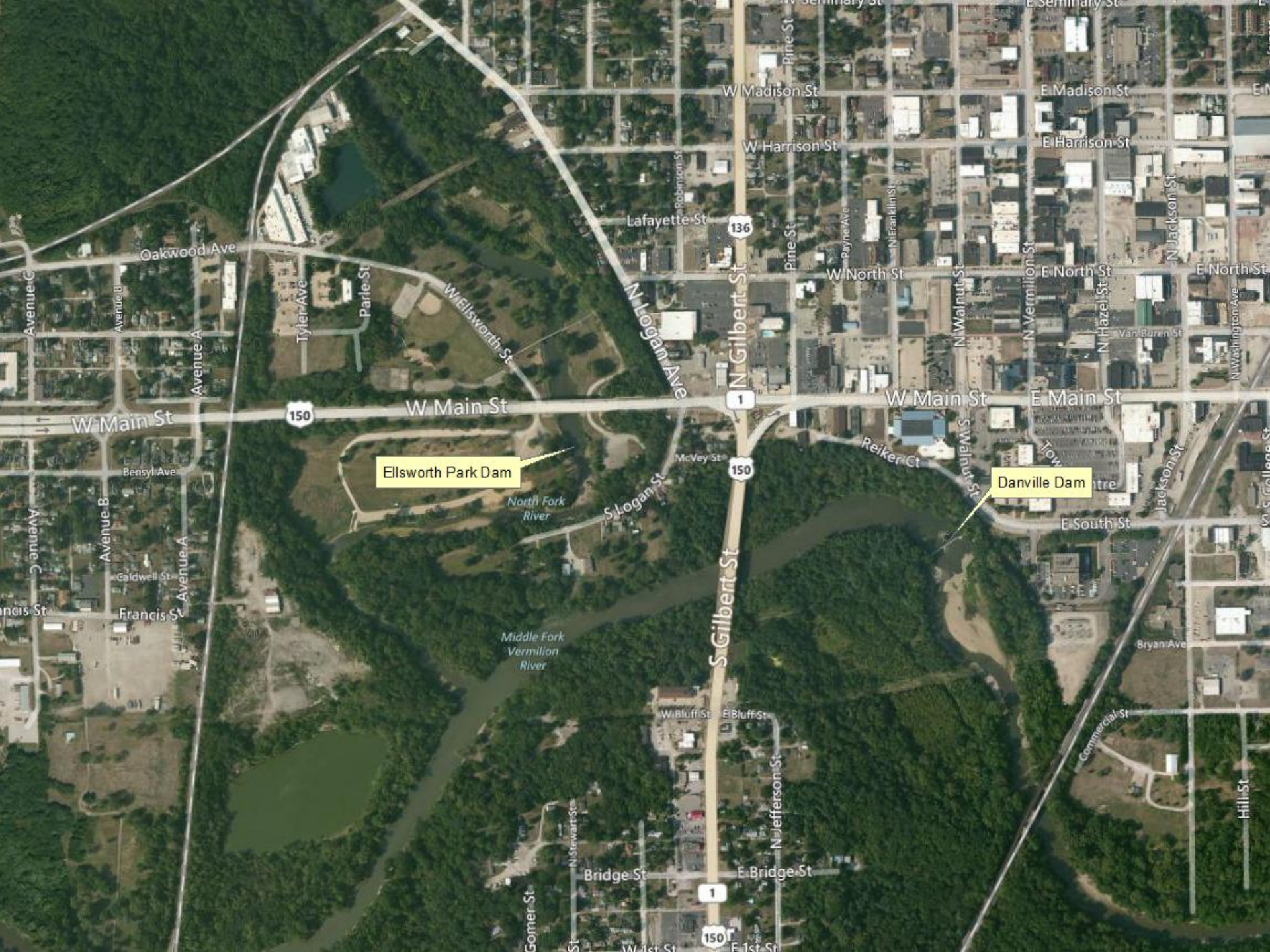
- Eliminate risk of life loss due to hydraulic roller below each dam
- Create a safe river for all users
- Reduce the need of emergency responders to put themselves in harms way

Ecological Benefits Goals

- Open 175 river miles for all fish species to move throughout in the river system
- Improve aquatic habitat within the impacted area
- Create additional habitat for threatened and endangered fish and mussels
- Improve water quality

Recreation Goals

- Enhance the recreational usage for watercraft
- Enhance recreational fishing opportunities
- Create a safe, natural area for the public to enjoy


Ellsworth Park Dam
Danville Dam
W Madison St
E Madison St
W Harrison St
E Harrison St
Lafayette St
Oakwood Ave
W North St
E North St
W Main St
E Main St
N Logan Ave
N Gilbert St
S Gilbert St
W Ellsworth St
Tyler Ave
Parle St
Avenue A
Avenue B
Avenue C
Bensyl Ave
Caldwell St
Francis St
McVey St
Reiker Ct
S Logan St
S Walnut St
E South St
North Fork River
Middle Fork Vermilion River
W Bluff St
E Bluff St
Bridge St
E Bridge St
N Jefferson St
N Stewart St
Commercial St
Bryan Ave
Hill St
Jackson St
N Jackson St
N Vermilion St
N Walnut St
N Hazel St
Van Buren St
N Washington Ave
Pine St
Payne Ave
N Franklin St
Robinson St
136
150
1

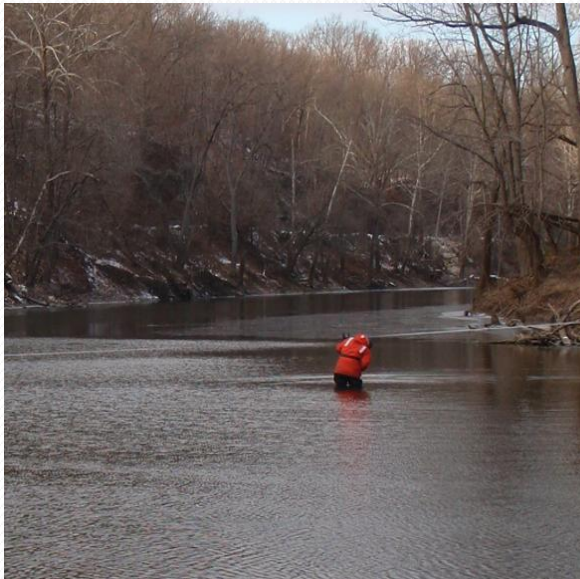
Conditions of the Dam

- Danville Dam
  - West abutment undercutting
  - West abutment erosion
  - East abutment undercutting
  - Eroded cap
  - Concrete spalling at dam face

- Ellsworth Park
  - West abutment erosion

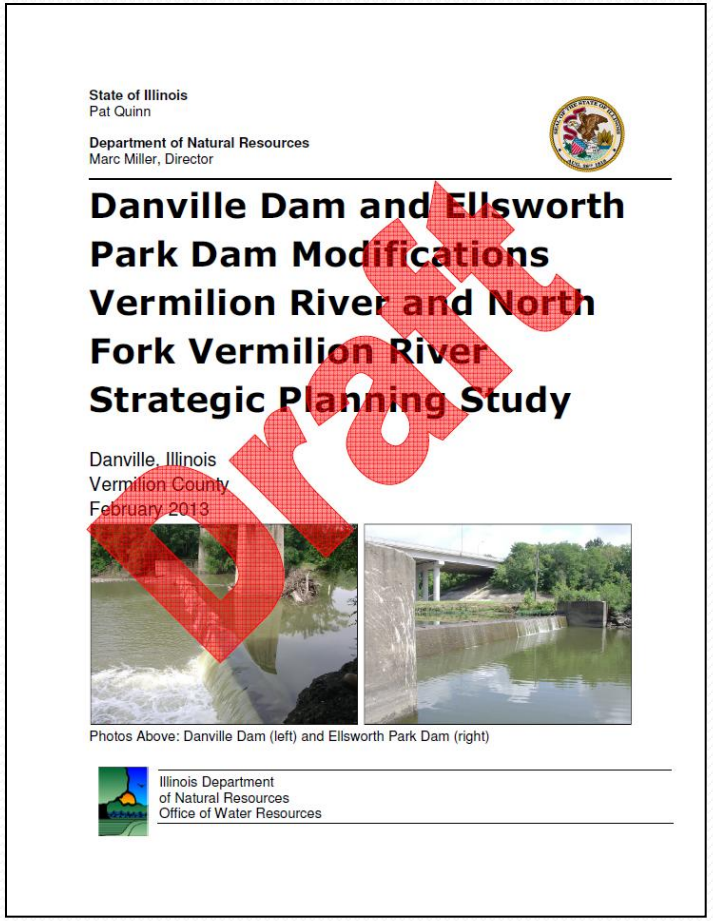
What was Studied?

- Draft Strategic Planning Study Completed
  - Extensive surveying
  - Sediment collection, testing and modeling
  - Water surface modeling
  - Environmental / aquatic investigation
  - Public safety improvement alternatives



Alternatives

- Full Removal
- Partial Removal
- Rock Ramp
- Concrete Steps


State of Illinois
Pat Quinn

Department of Natural Resources
Marc Miller, Director

Danville Dam and Ellsworth Park Dam Modifications Vermilion River and North Fork Vermilion River Strategic Planning Study

Danville, Illinois
Vermilion County
February 2013

Draft

Photos Above: Danville Dam (left) and Ellsworth Park Dam (right)

Illinois Department
of Natural Resources
Office of Water Resources

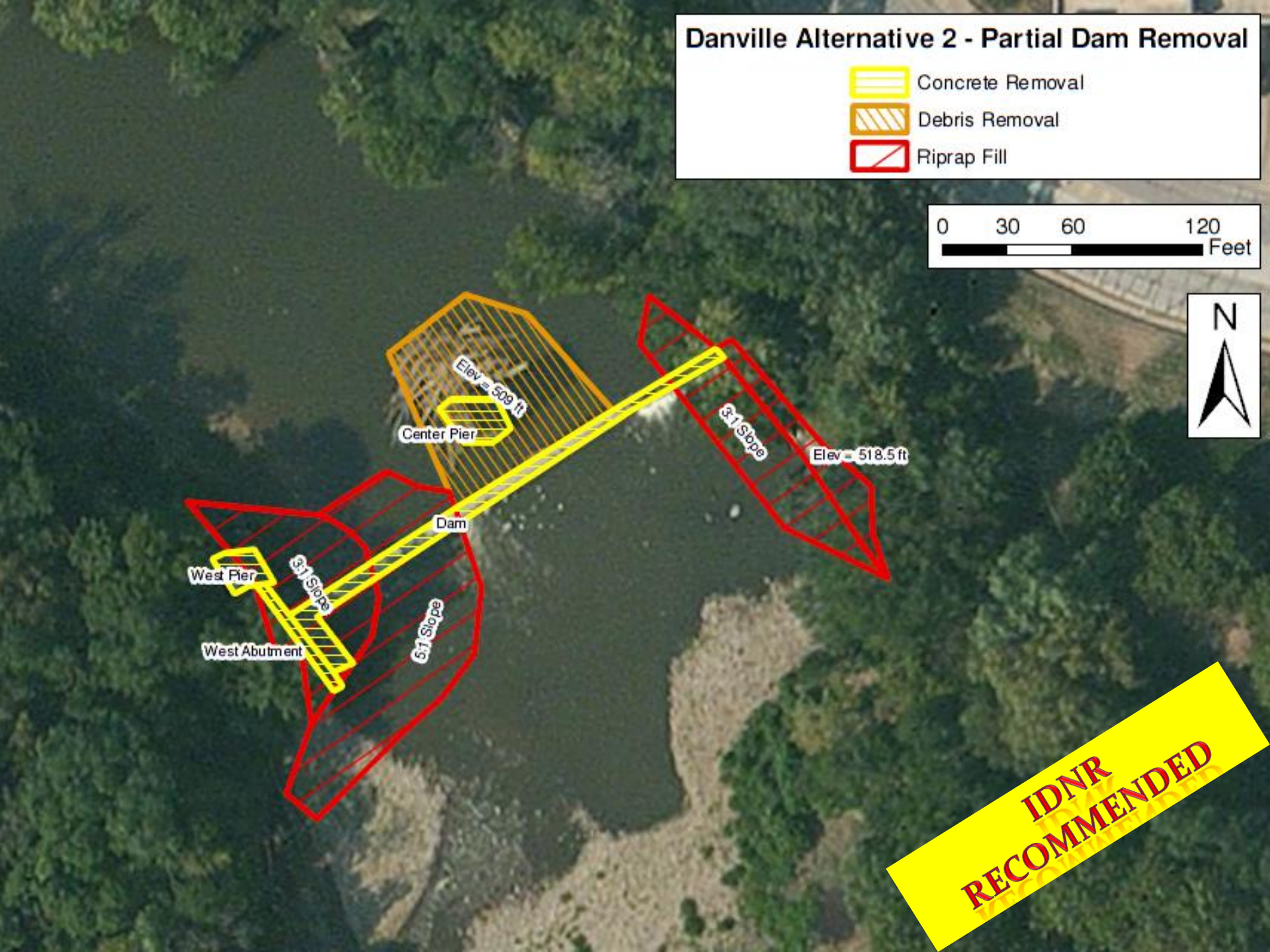
All Alternative layouts and costs estimates are conceptual and will be modified in final design


Danville Dam - Existing
0 30 60 120
Feet
N

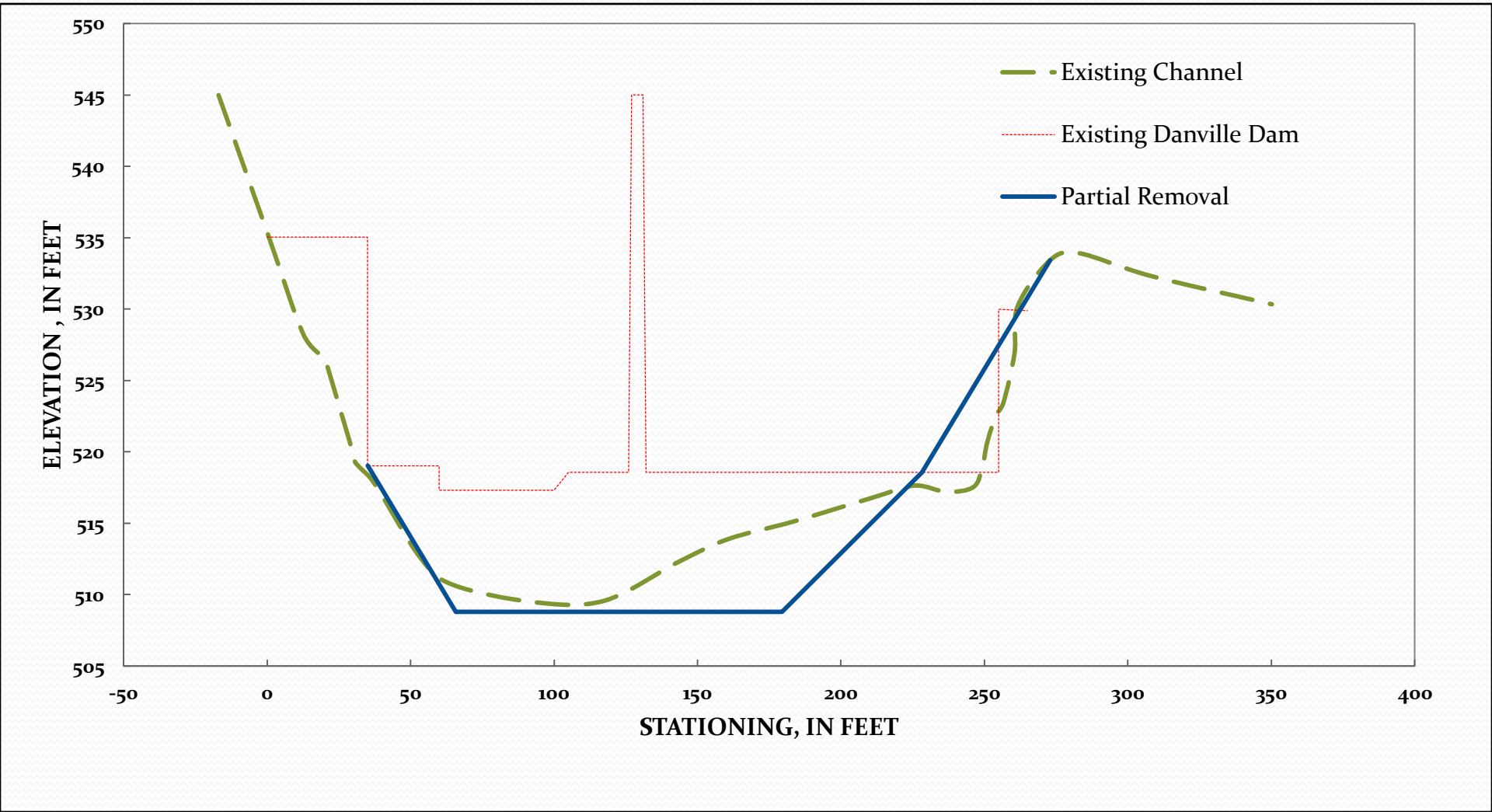

Danville Alternative 1 - Full Dam Removal
Concrete Removal
Material Removal
0
30
60
120
Feet
N
Material Excavation
Center Pier
Dam
West Pier
West Abutment

Full Removal

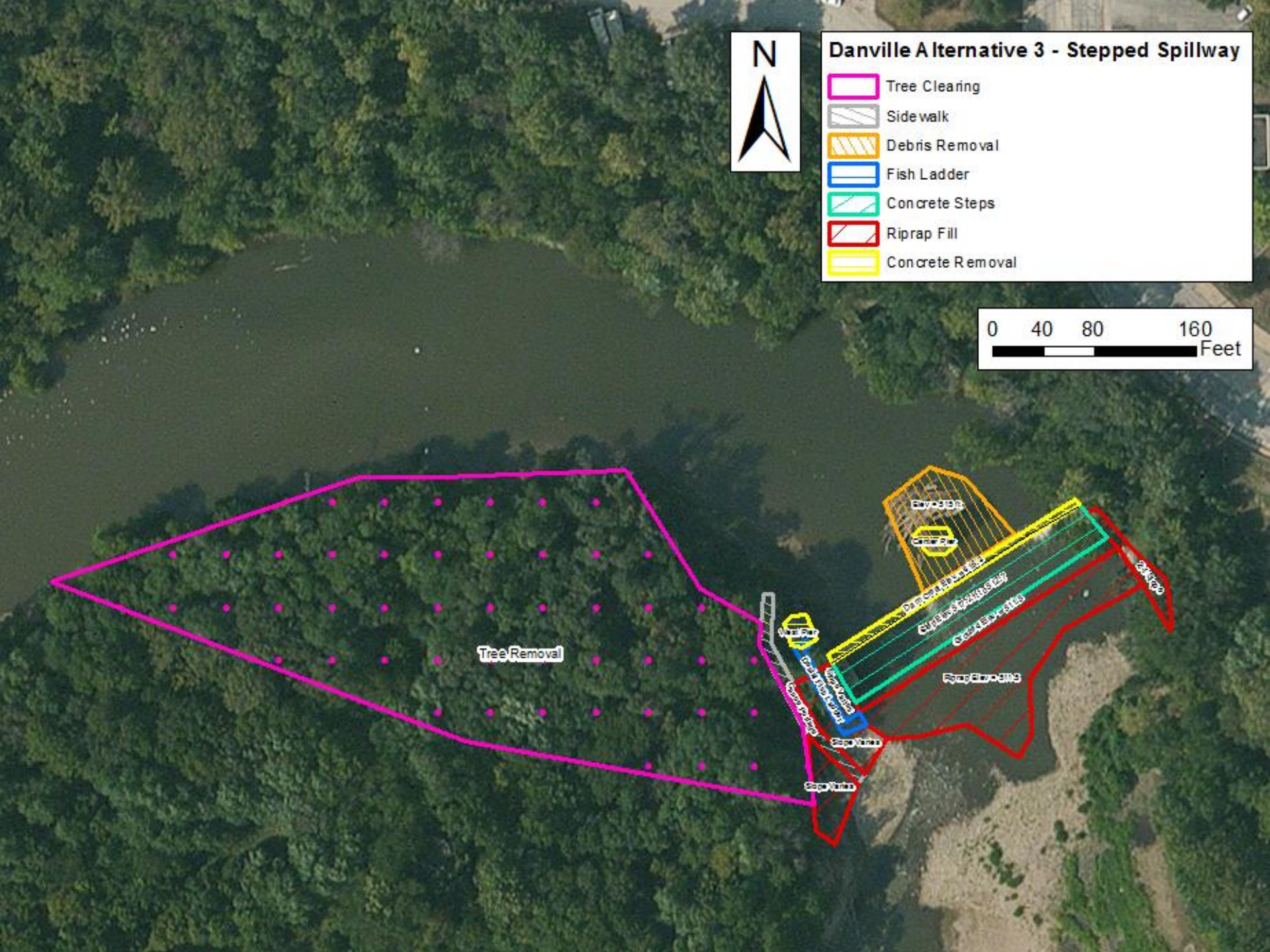
Low Flow Condition (150 cfs), upstream of Danville Dam pool


Danville Alternative 2 - Partial Dam Removal
Concrete Removal
Debris Removal
Riprap Fill
0
30
60
120
Feet
N
Elev = 509 ft
Center Pier
3:1 Slope
Elev = 518.5 ft
Dam
West Pier
3:1 Slope
5:1 Slope
West Abutment
IDNR
RECOMMENDED

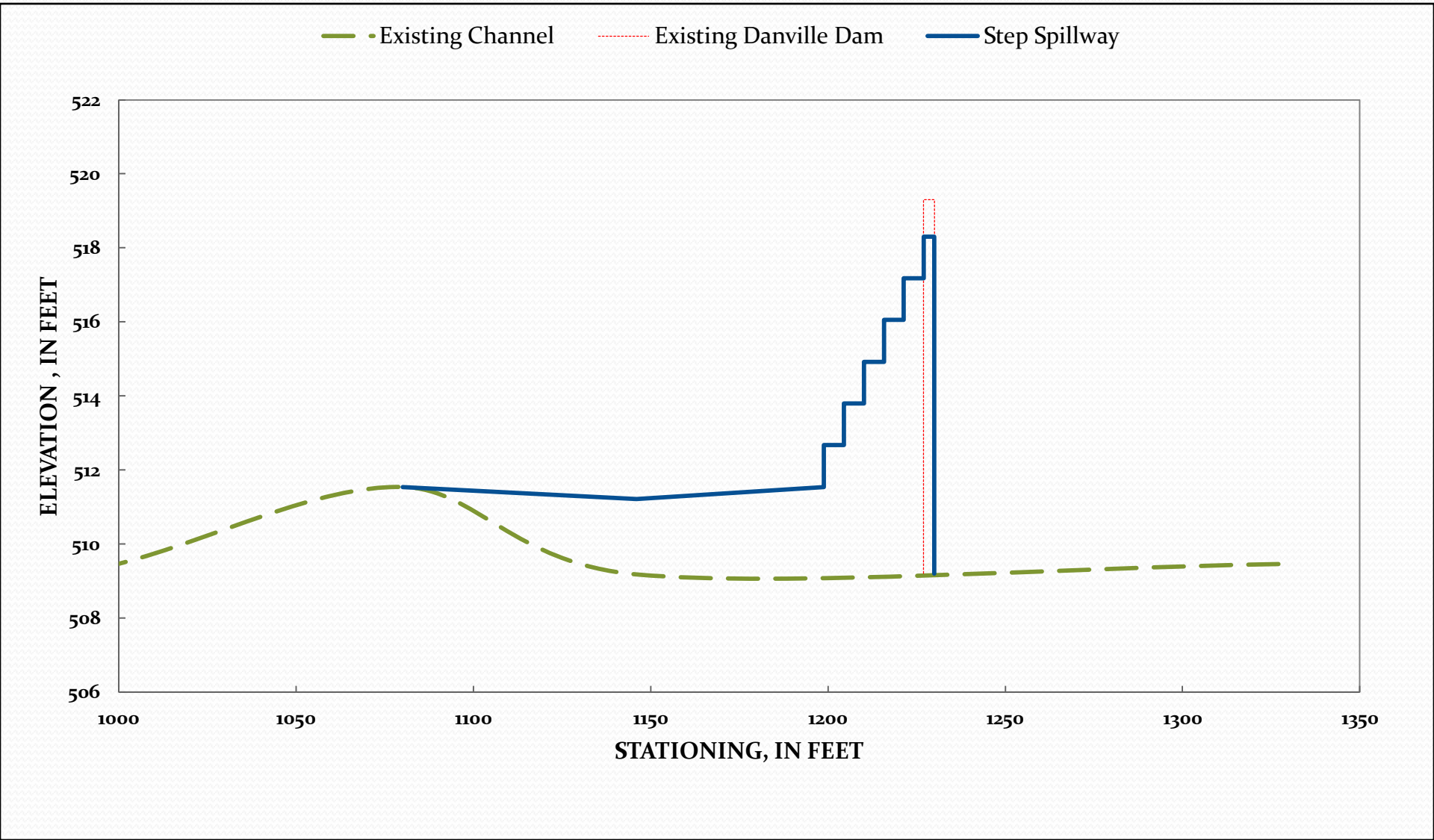
Cross Section - Looking Downstream



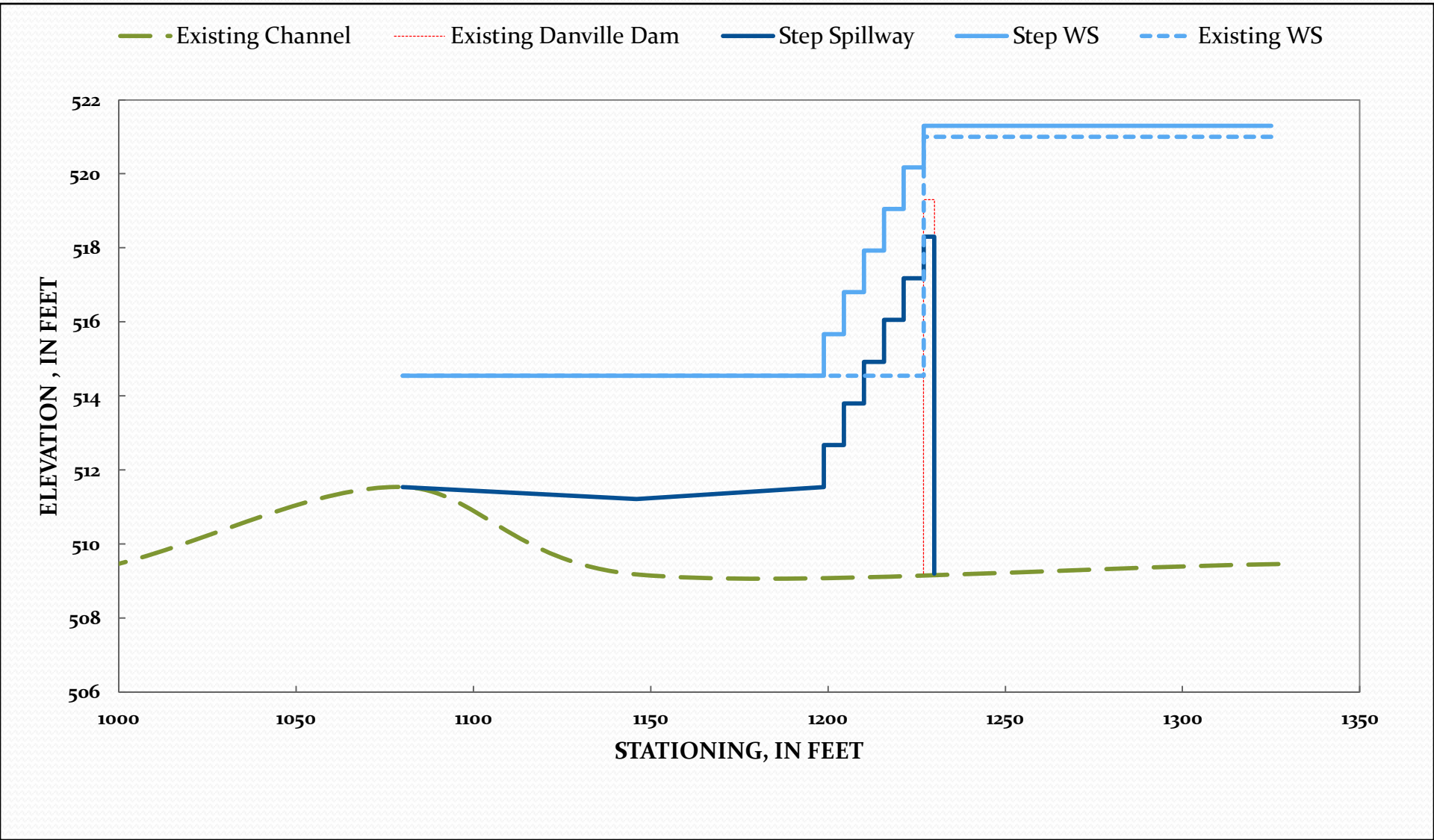
Partial Removal


N
Danville Alternative 3 - Stepped Spillway
Tree Clearing
Sidewalk
Debris Removal
Fish Ladder
Concrete Steps
Riprap Fill
Concrete Removal
0 40 80 160
Feet
Tree Removal

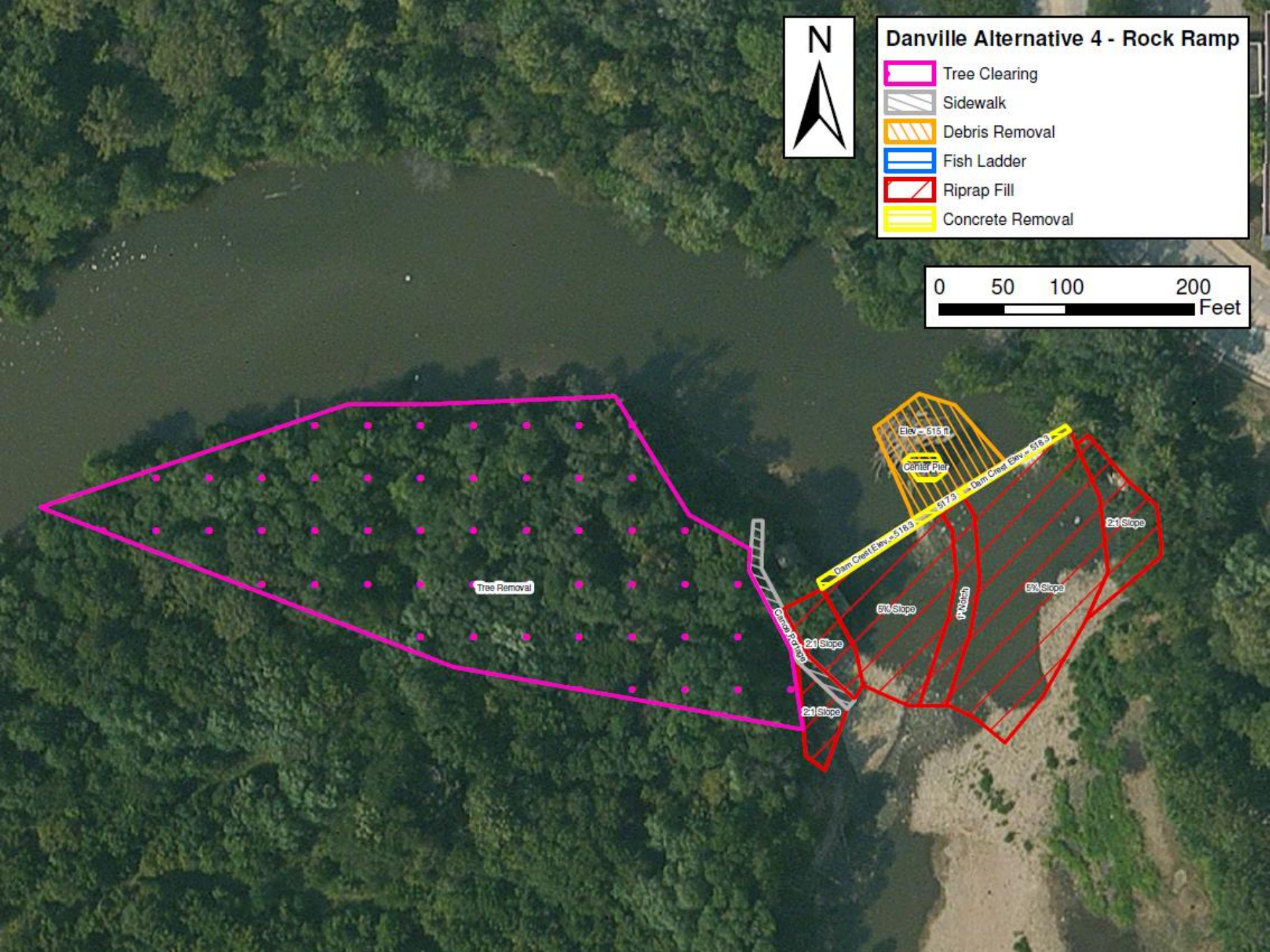
Steps – Profile View



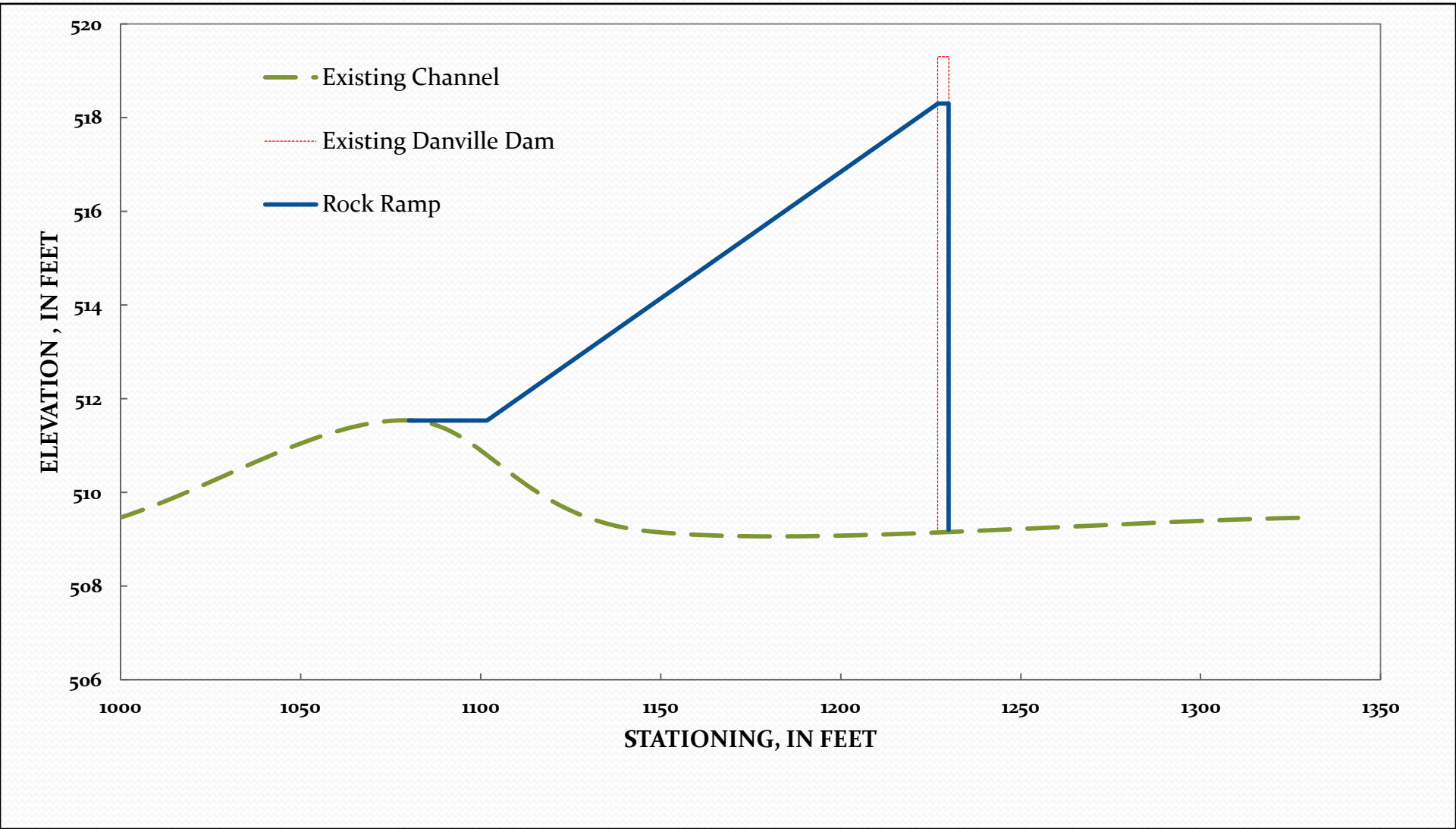
Steps – Profile View



Concrete Steps

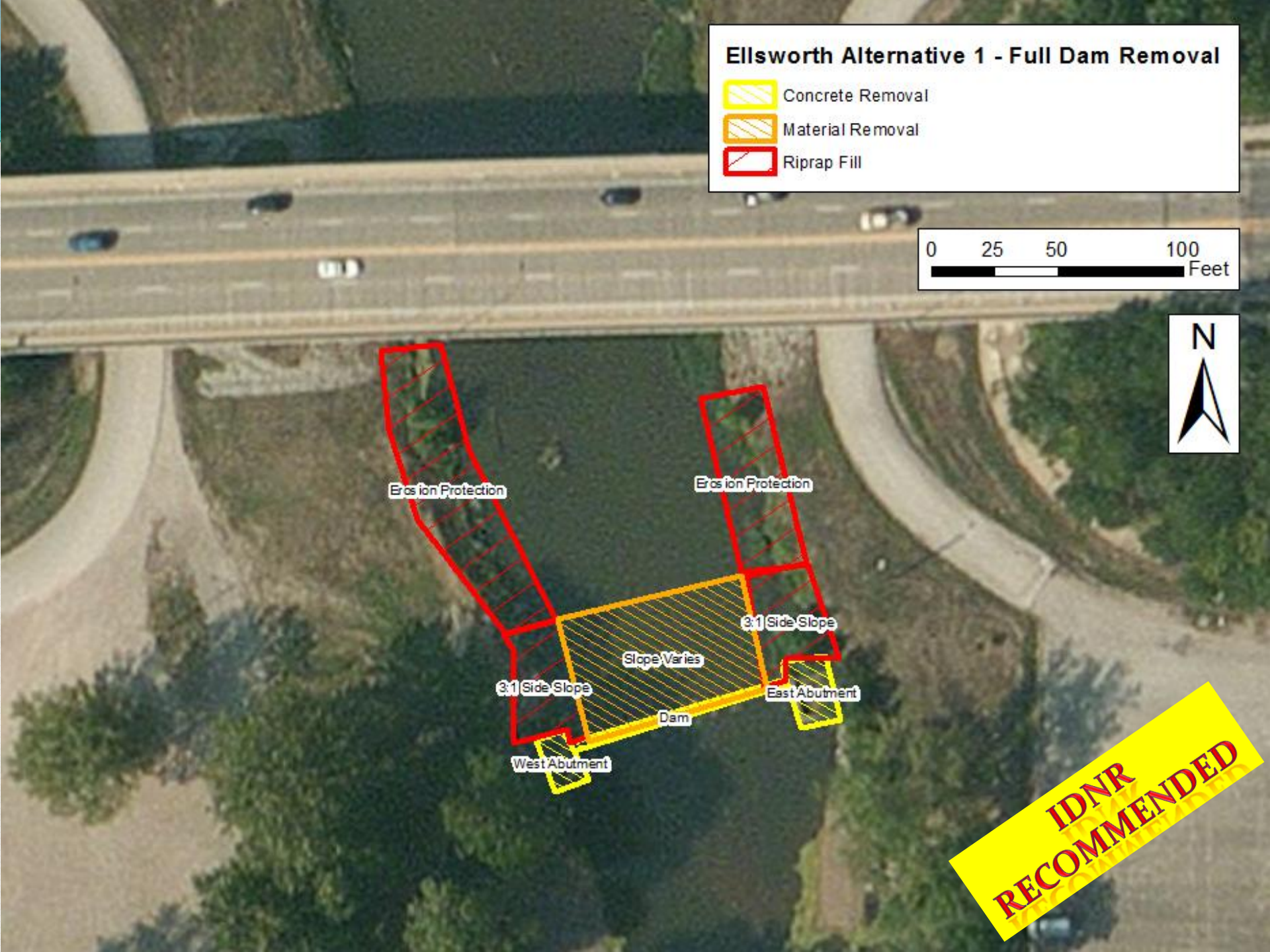

N
Danville Alternative 4 - Rock Ramp
Tree Clearing
Sidewalk
Debris Removal
Fish Ladder
Riprap Fill
Concrete Removal
0
50
100
200
Feet
Tree Removal
Elev = 515 ft
Center Pier
Dam Crest Elev = 518.3
517.3
Dam Crest Elev = 518.3
2:1 Slope
5% Slope
5% Slope
J-Notch
2:1 Slope
Canoe Portage
2:1 Slope

Rock Ramp – Profile View



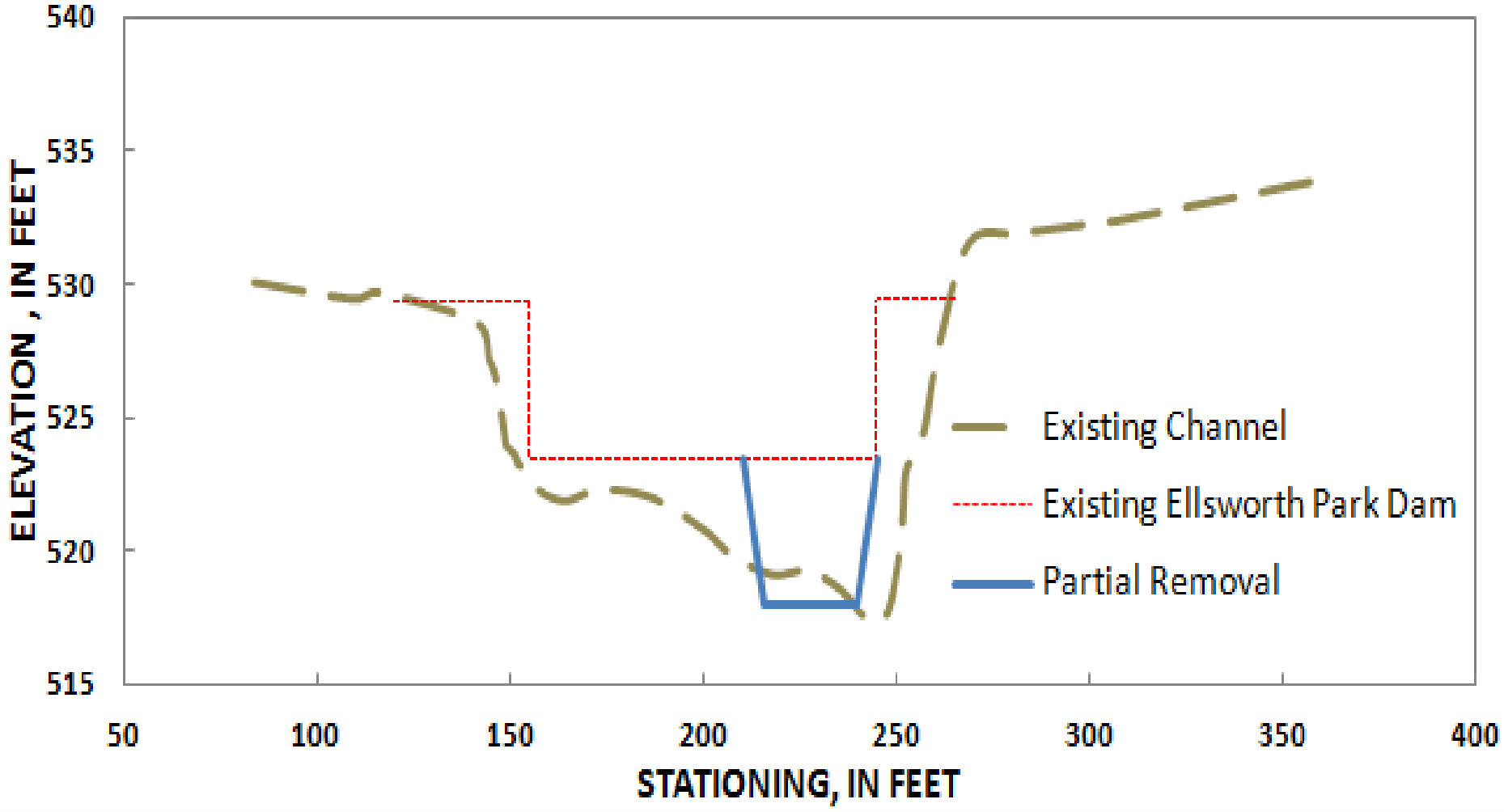
Rock Ramp

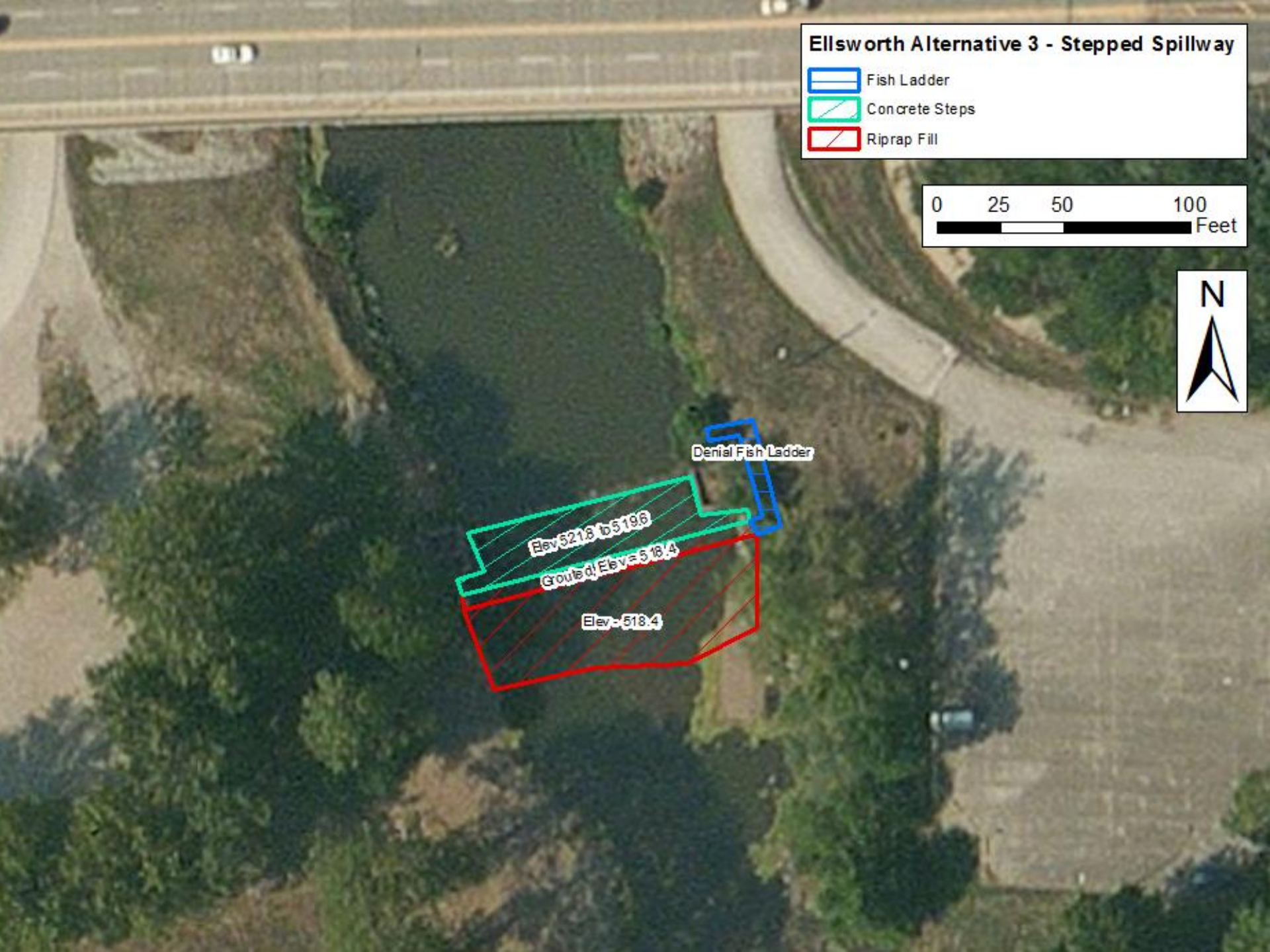
Ellsworth Park Dam - Existing
0 25 50 100
Feet
N


Ellsworth Alternative 1 - Full Dam Removal
Concrete Removal
Material Removal
Riprap Fill
0 25 50 100
Feet
N
Erosion Protection
Erosion Protection
3:1 Side Slope
Slope Varies
3:1 Side Slope
East Abutment
Dam
West Abutment
IDNR RECOMMENDED


Ellsworth Alternative 2 - Partial Removal
Concrete Removal
Material Removal
Riprap Fill
0
25
50
100
Feet
N
Erosion Protection
Erosion Protection
Slopes Varies
3:1 Side Slope
Dam
Riprap Fill

Cross Section - Looking Downstream




Ellsworth Alternative 3 - Stepped Spillway
Fish Ladder
Concrete Steps
Riprap Fill
0
25
50
100
Feet
N
Denial Fish Ladder
Elev 521.8 to 519.6
Grouted Elev = 518.4
Elev - 518.4


Ellsworth Alternative 4 - Rock Ramp
Riprap Fill
Concrete Removal
0
25
50
100
Feet
N
1' Notch
3:1 Side Slope
4% Longitudinal Slope
1' Notch
4% Longitudinal Slope
3:1 Side Slope

Summary of Alternative Costs

Alternative	Total Danville Dam Alternative Costs	Total Ellsworth Park Dam Alternative Costs	Land Rights Costs
1 - Full Removal	$1,464,300	**$275,500**	$0
2 - Partial Removal	**$1,832,000**	$198,900	$0
3 - Stepped Spillway	$3,725,600	$1,043,100	$240,000
4 - Rock Ramp	$2,706,700	$1,080,400	$136,000
5 - Do Nothing	$0	$0	$0
Recommended	**$1,832,000**	**$275,500**	**$0**

*Flood Easements required for the Ellsworth Park Dam Alternatives

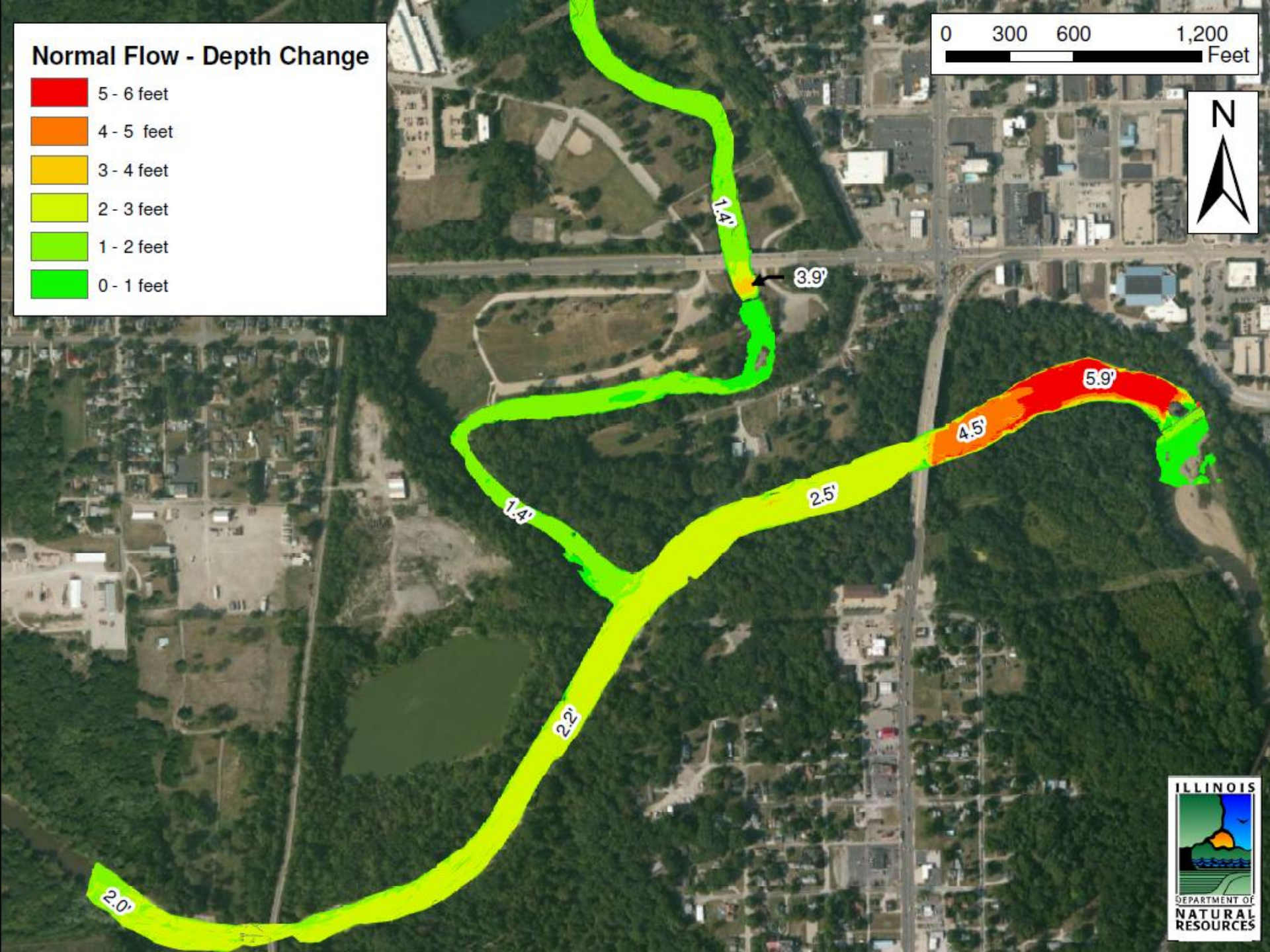
Summary of Alternative Impacts

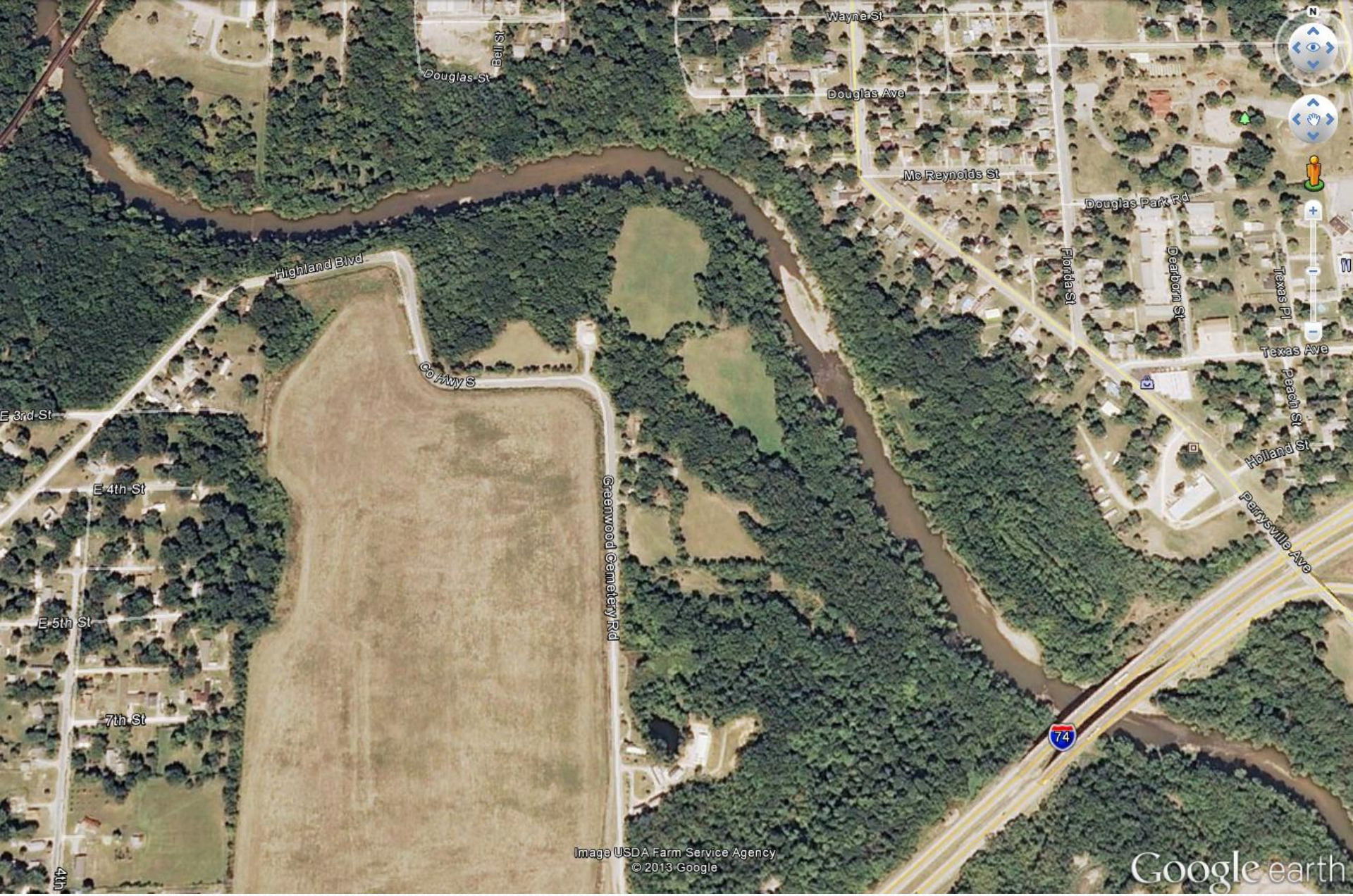
Alternative	Removes Pool	Public Safety	Safe Canoe Passage	Fish Passage	Acres of Easements	Tree Removal (Acres)
1 - Full Removal	Yes	Restored	Yes	Restored	0	0.52
2 - Partial Removal	Yes	Restored	Yes	Restored	0	0.52
3 - Stepped Spillway	No	Improved	Portage	Improved	60	2.52
4 - Rock Ramp	No	Improved	Portage	Improved	34	2.52
5 - Do Nothing	No	None	No	Very Limited	0	0.00

Common Concerns and Misconceptions

Typical Comments

- Rivers are like bathtubs, if dammed they are full of water, if undammed they empty out
- The pool area will become a mud flat
- We will not be able to fish
- You will not be able to do any type of boating


Normal Flow - Depth Change
5 - 6 feet
4 - 5 feet
3 - 4 feet
2 - 3 feet
1 - 2 feet
0 - 1 feet
0 300 600 1,200
Feet
N
1.4'
3.9'
5.9'
4.5'
2.5'
1.4'
2.2'
2.0'
ILLINOIS
DEPARTMENT OF
NATURAL
RESOURCES



November 6, 2011 – 150 cfs

No mudflats or swamp areas

- River bottom consists of sands and gravels
- Sand / Gravel bars will be exposed during low flows

River will remain able to canoe

- Existing pool formed by dam only extends to just beyond the upstream Railroad Bridge. With the dam removed, this area will be able to canoe and no further impacts will occur upstream

- Kickapoo Landing currently uses the Vermilion to Ellsworth Park and will continue to be able to if the dam is removed

Upstream Impacts

The boat ramp will be useable during normal conditions

		Frequency the Depth will be exceeded		
Water Depth on Ramp (ft)	**Submerged Length (ft)**	**Existing**	**Initial Removal**	**Long Term Removal**
0	0	100%	100%*	78%
1	5	99%	99%*	45%
2	10	85%	59%	27%
3	15	58%	23%	16%
4	20	30%	12%	9%
5	25.8	15%	7%	5%
6	32.5	8%	4%	4%

**Water depth at confluence may limit access to the Vermilion River*

Fishing will remain an opportunity

- Fishing opportunities will remain
- 50% of the time, water depth will be 30 inches or more upstream of the IL Rte 1 bridge
- USGS gage is available to check river conditions
- Lake Vermilion is a great boat fishing resource for dry conditions

Fisheries Assessments

at

Danville Dam on the Vermilion River

and

Ellsworth Park Dam on the North Fork Vermilion River

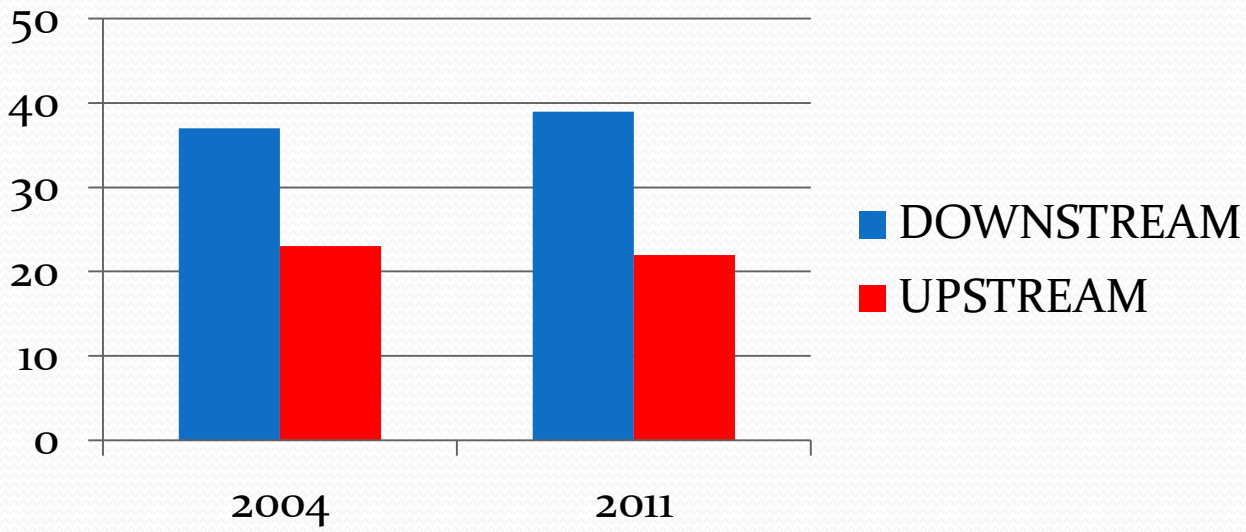
April 30, 2013

Trent Thomas
Rivers & Streams Biologist
Illinois Department of Natural Resources
Division of Fisheries

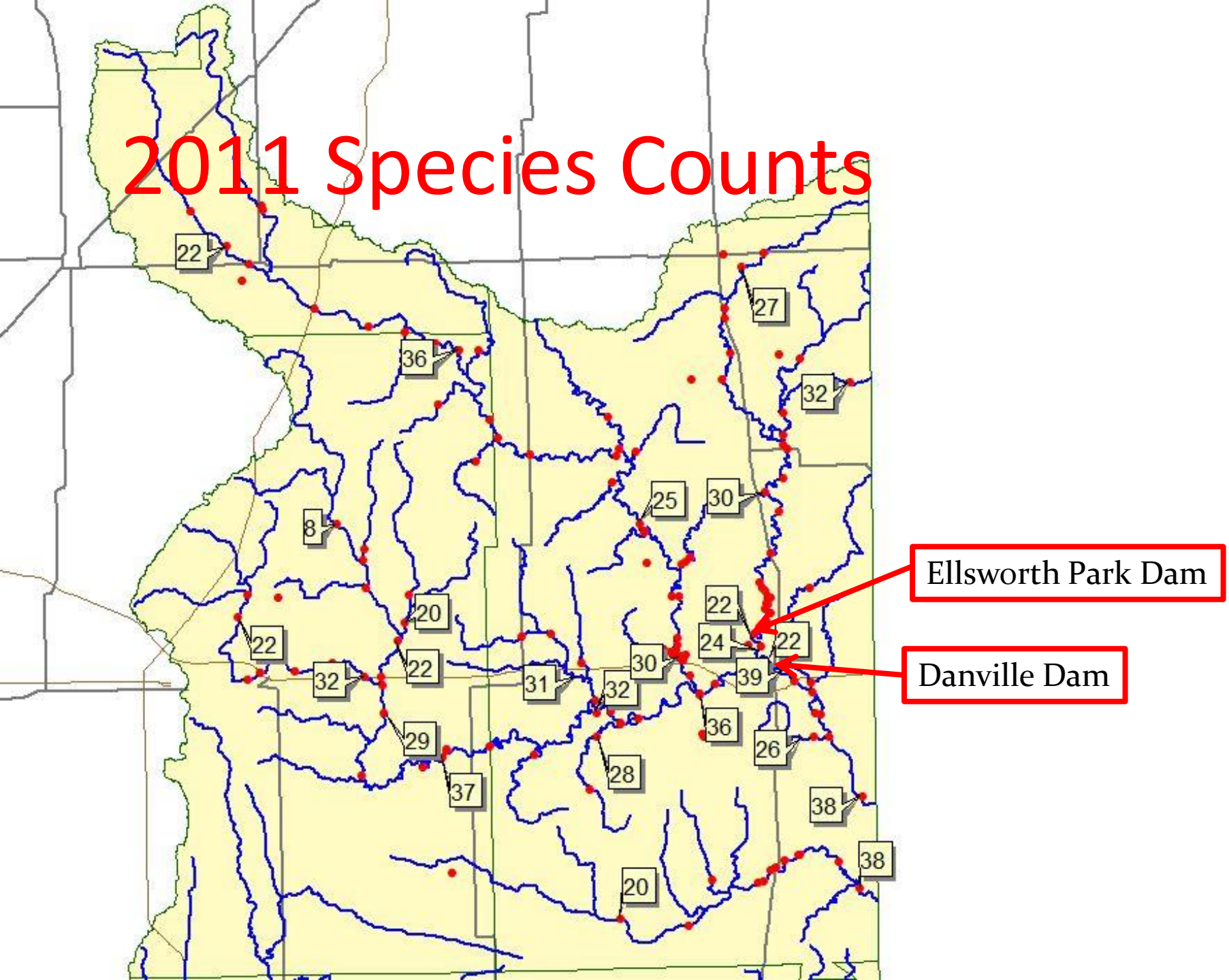
Dam removal discussions for several years now…

- 2004 at Danville Dam: **37** fish species below the dam and **23** above.

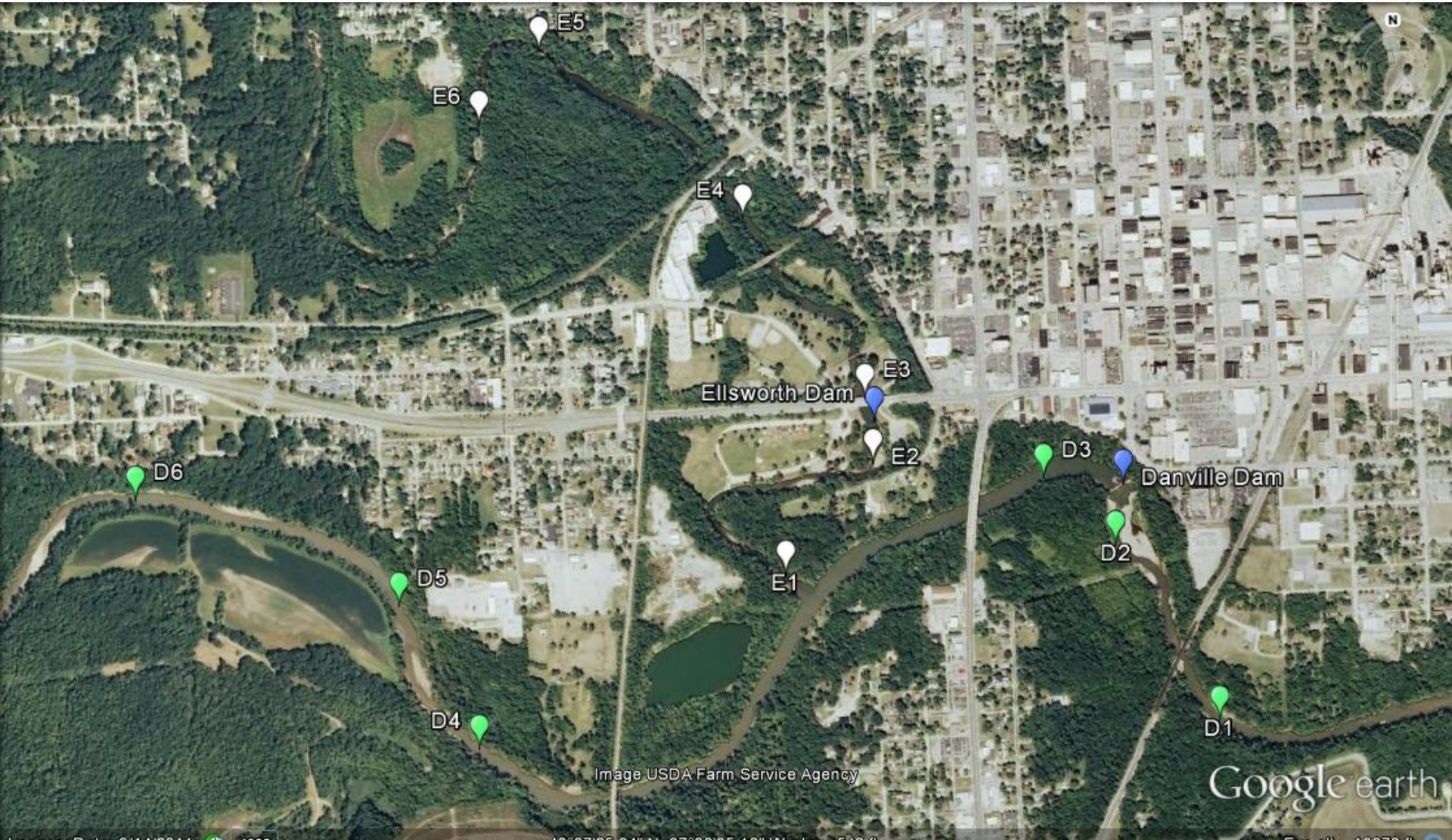
- 2011 at Danville Dam: **39** fish species below the dam and **22** above.



2011 Species Counts

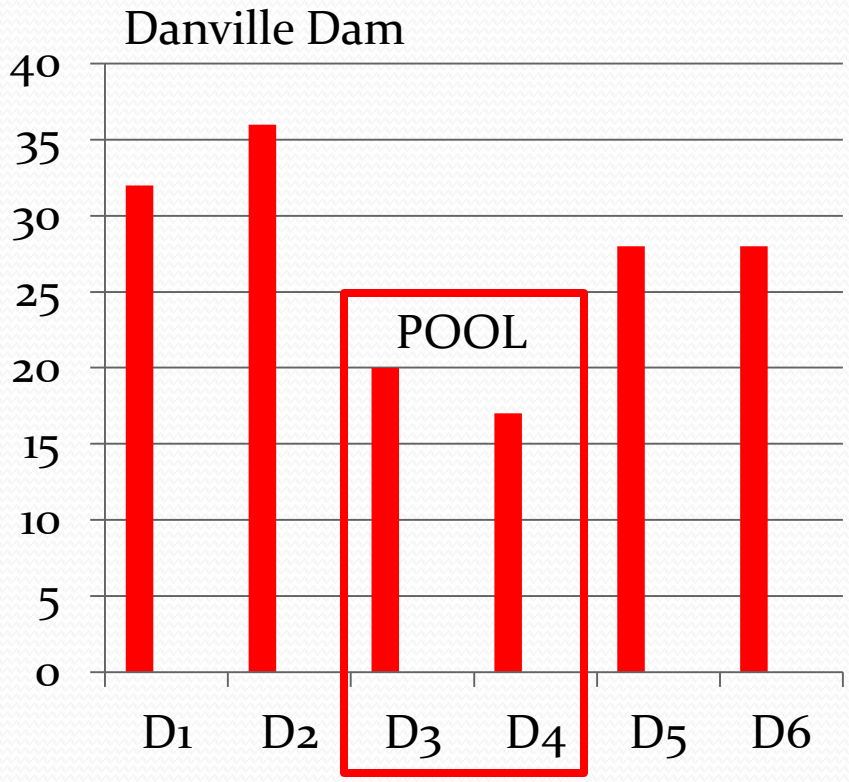


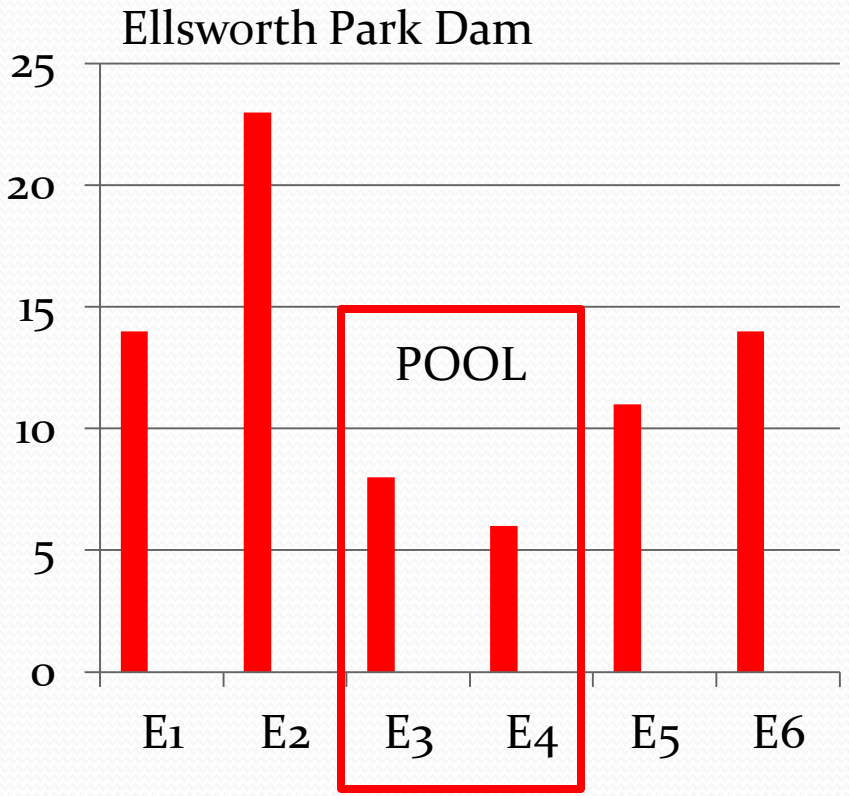
In 2012, Eastern Illinois University was contracted to conduct intensive surveys to assess the dams' impact.



Species Richness

- Total of 54 species
- Vermilion: 47
- North Fork: 31



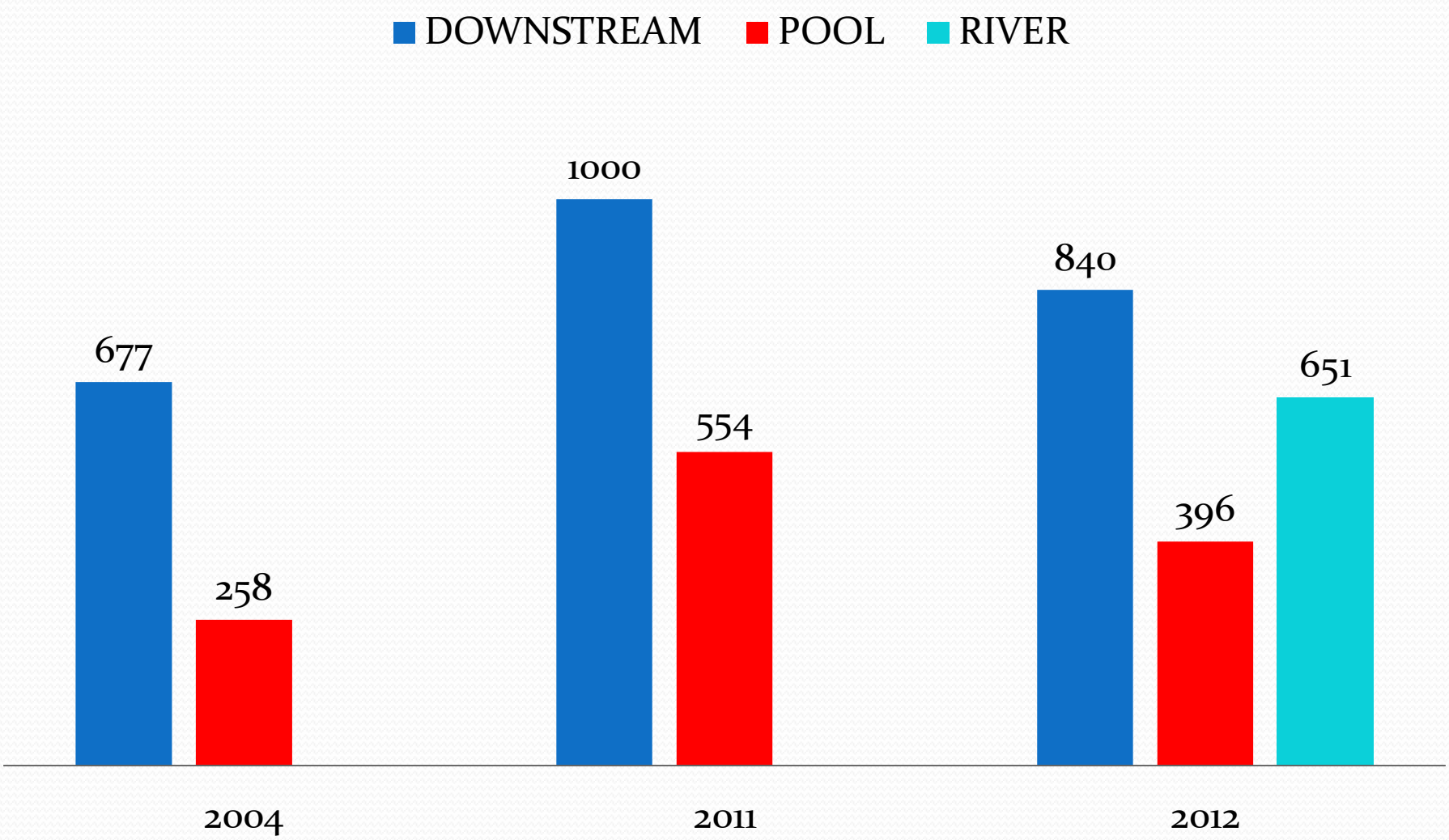


Disrupted By Dams

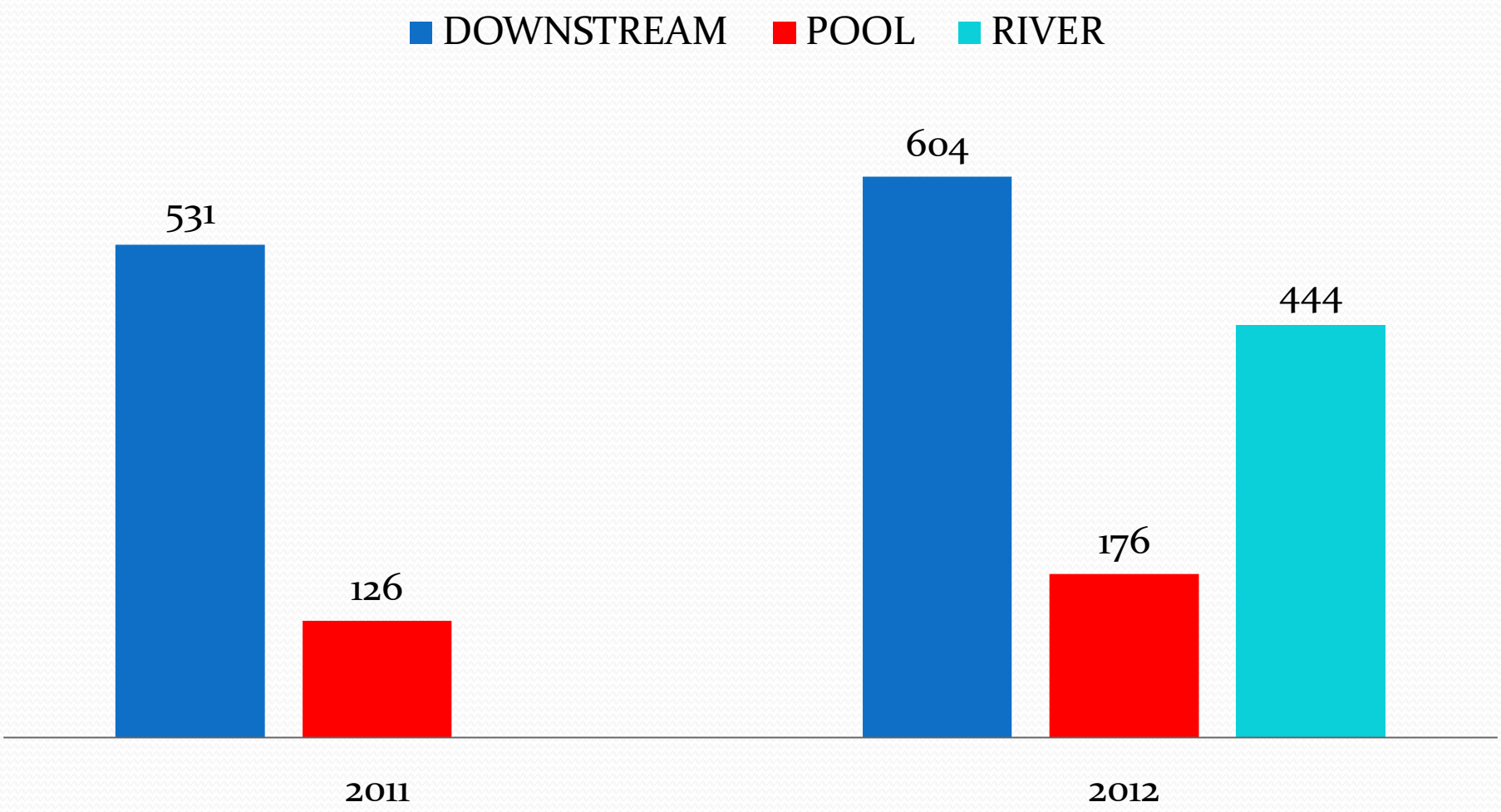
- Vermilion
  - S=12
- North Fork
  - S=8

Vermilion	**North Fork**
Bigeye Chub	Channel Catfish
River Redhorse	Central Stoneroller
Golden Redhorse	Greenside Darter
Silver Redhorse	Logperch
Black Redhorse	Rainbow Darter
Shorthead Redhorse	Smallmouth Bass
Quillback	Warmouth
Highfin Carpsucker	Mosquito Fish
Emerald Shiner	
Freshwater Drum	
Silverjaw Minnow	
Yellow Bass	

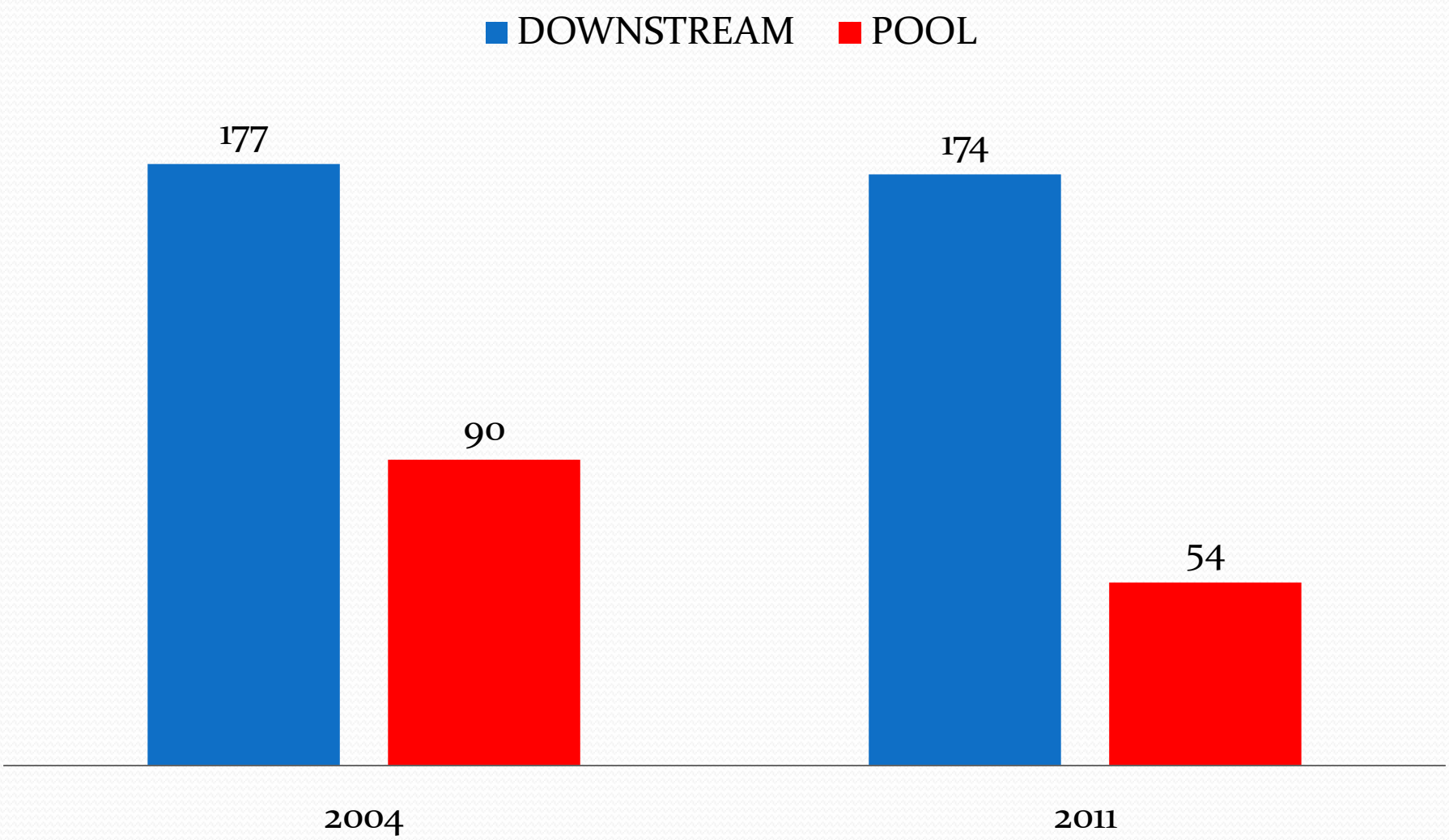
Fish Abundance at Danville Dam



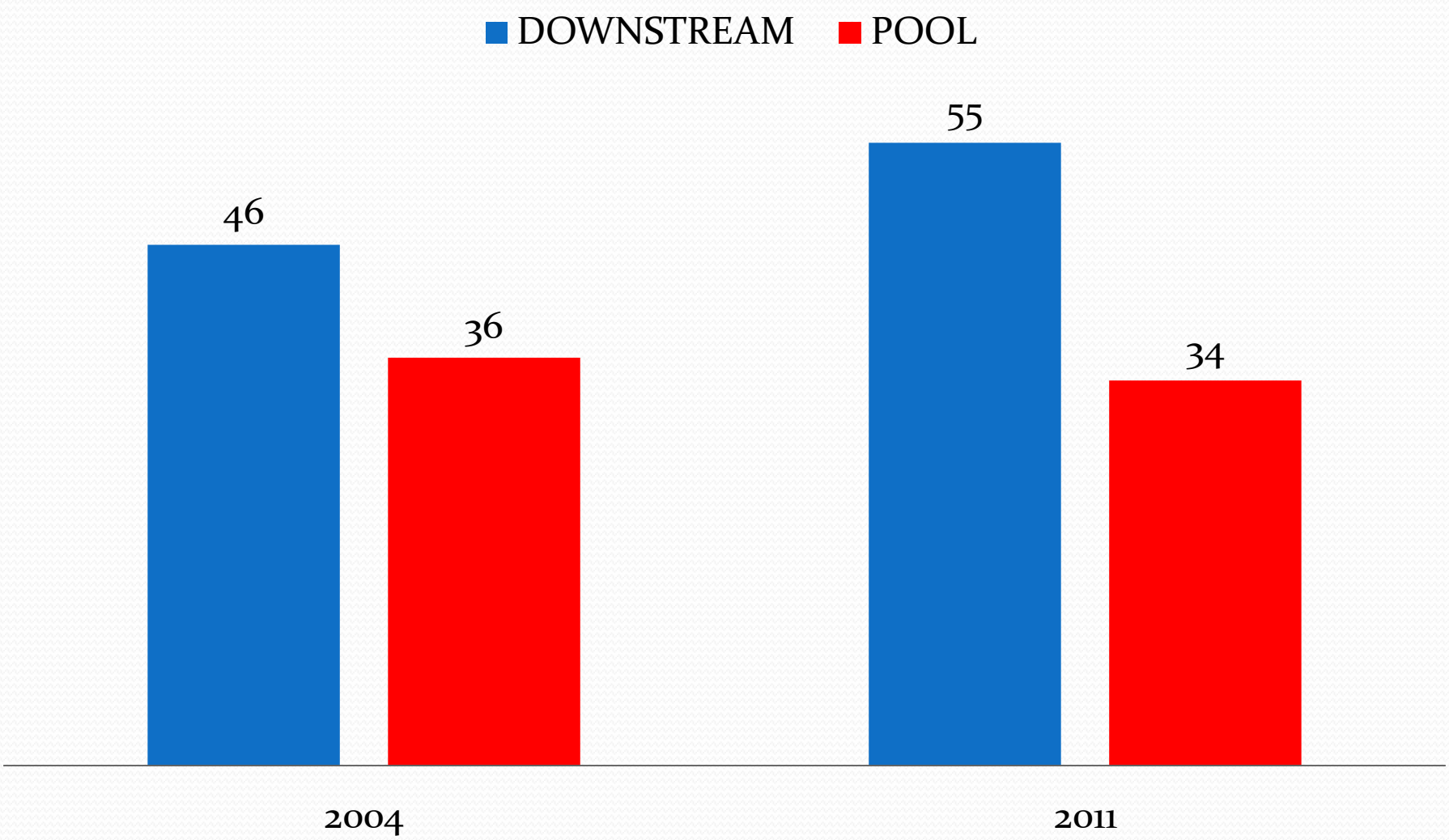
Fish Abundance at Ellsworth Park Dam



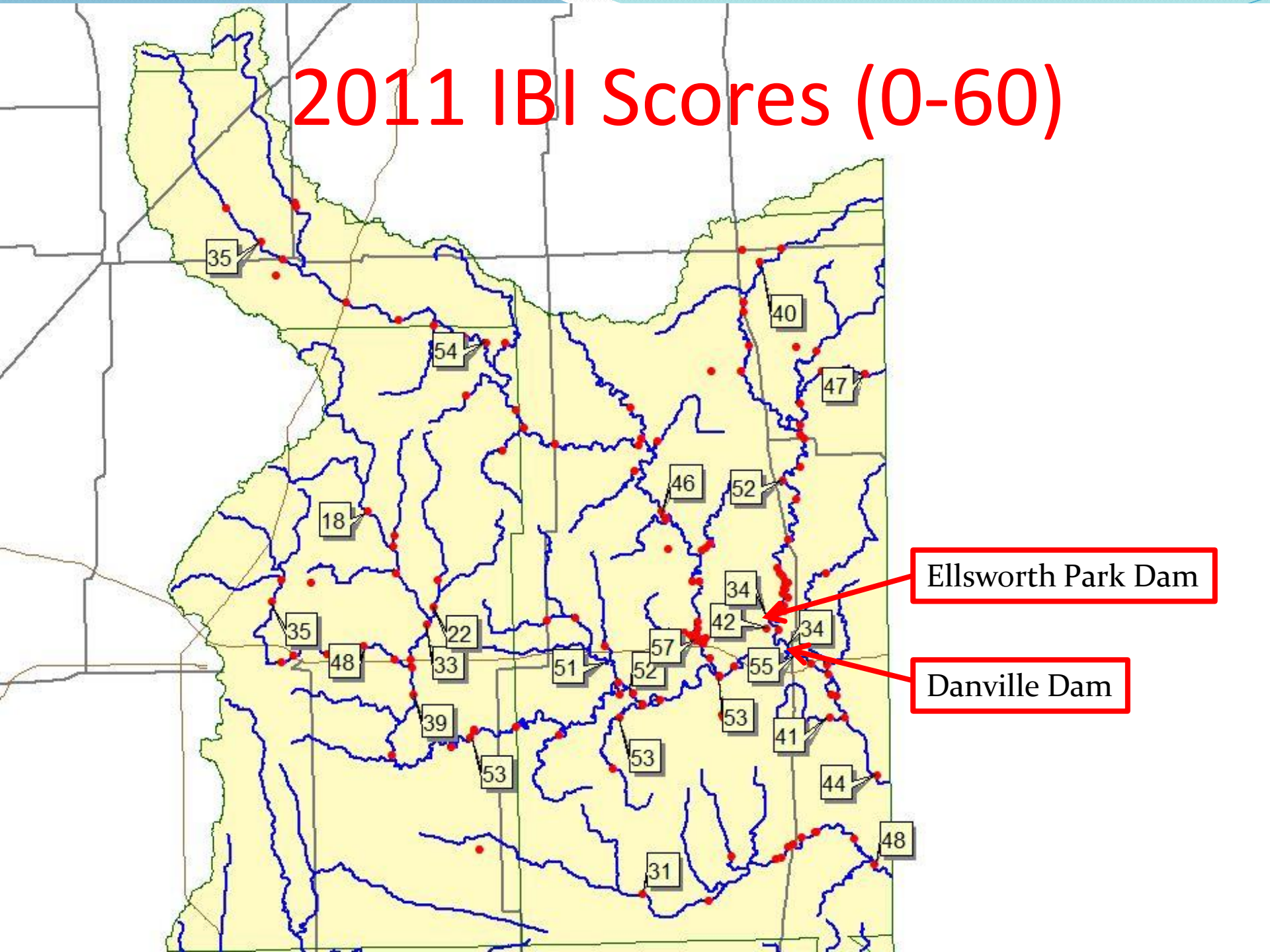
Fish Biomass (pounds) at Danville Dam



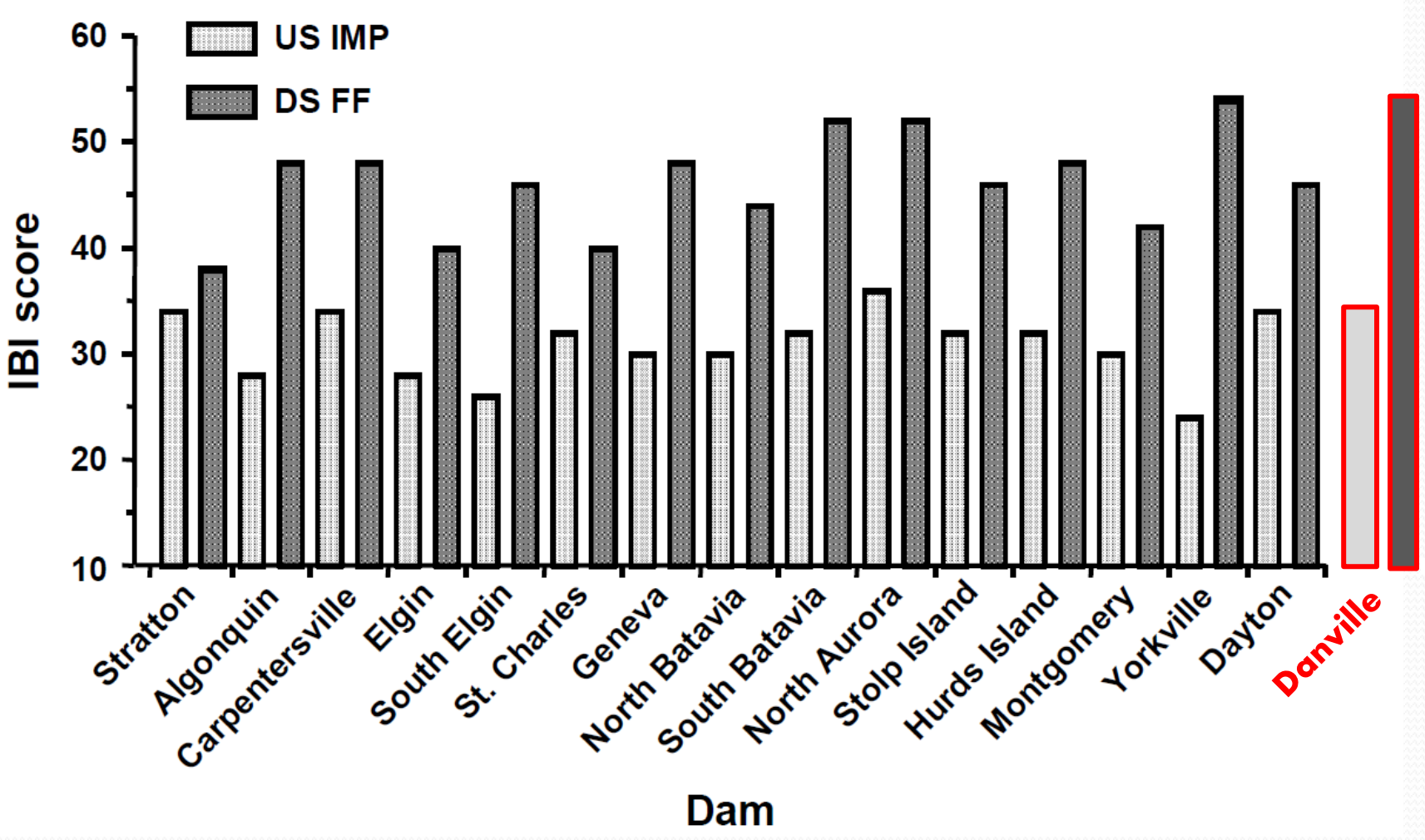
Index of Biotic Integrity (0-60 scale) at Danville Dam



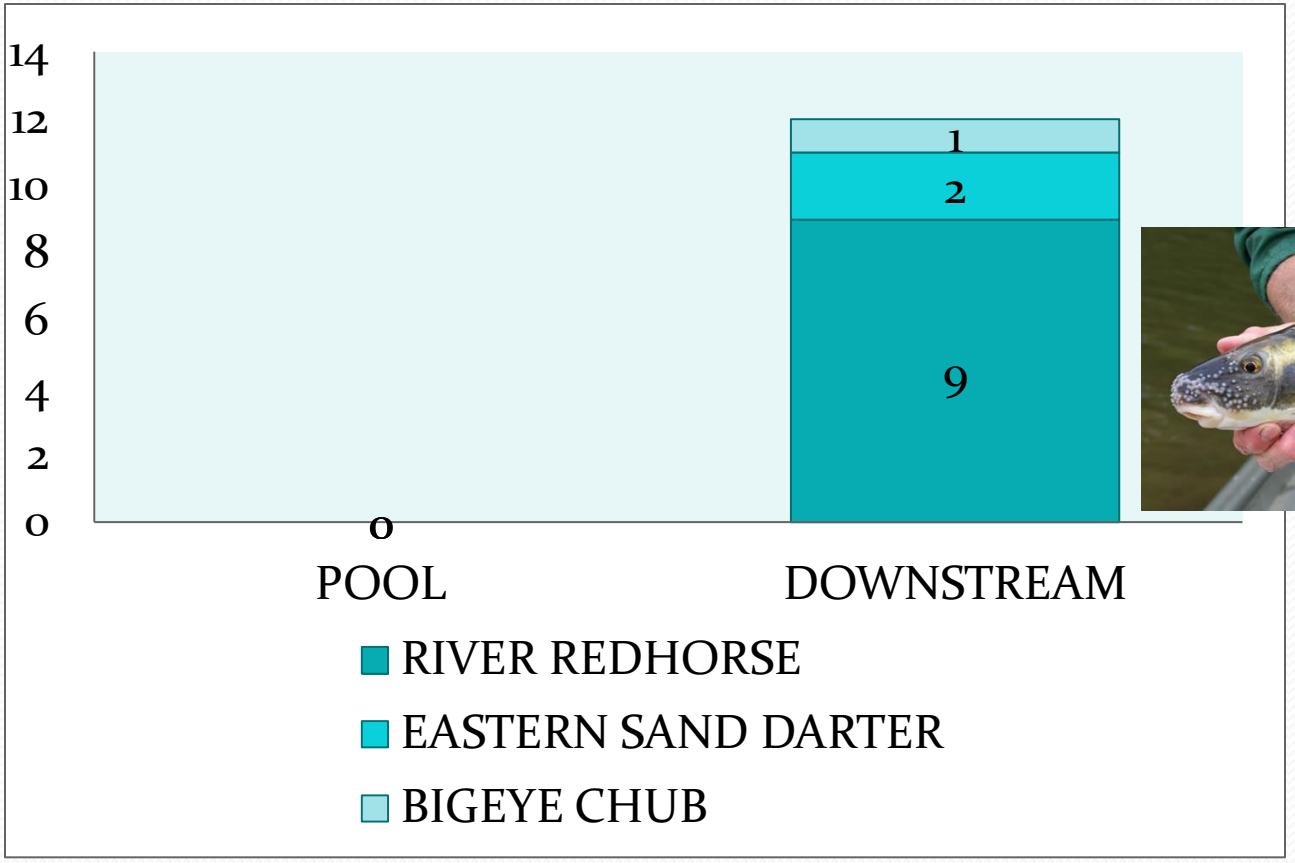
2011 IBI Scores (0-60)



This is not a unique situation for Danville Dam… as shown in this Fox River Study

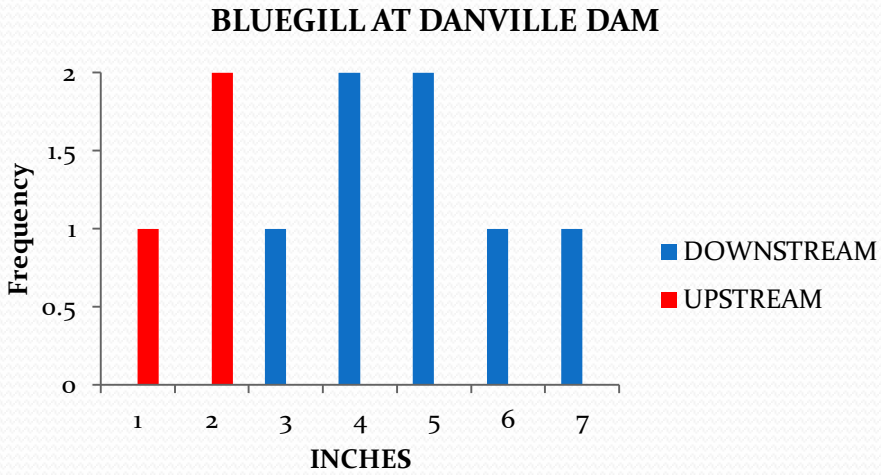


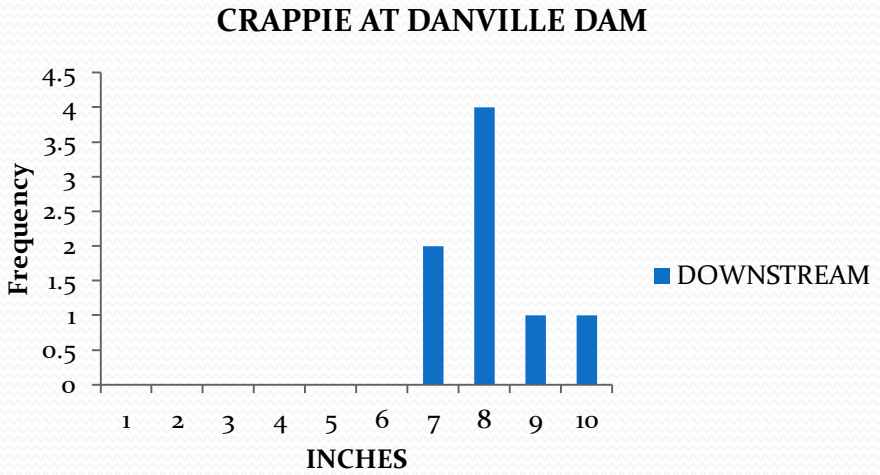
The impoundments also appear to be impacting the distribution of rare state-listed fish species in the Vermilion River basin.

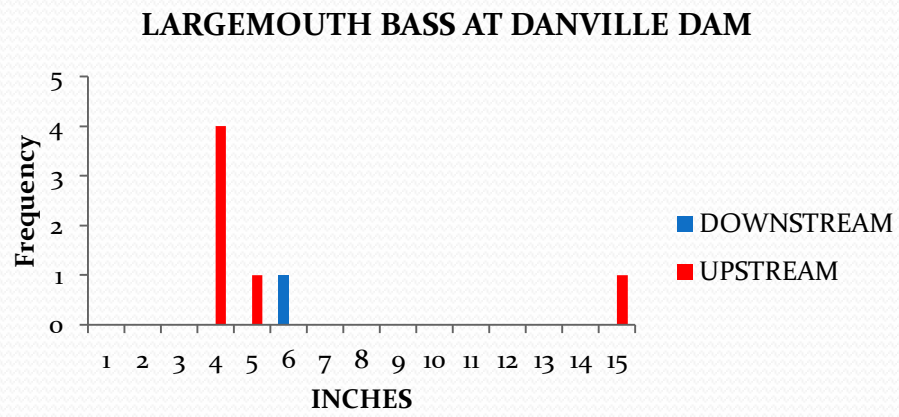


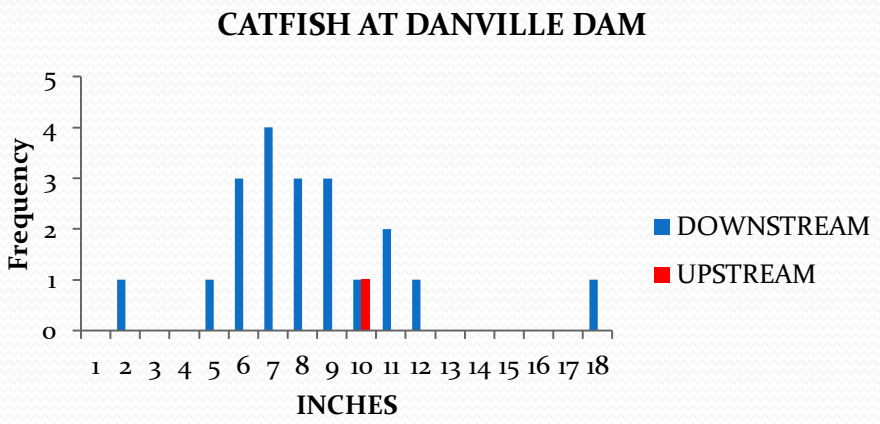
Sportfish Concerns at Danville Dam

IDNR Surveys: September 6-8, 2011



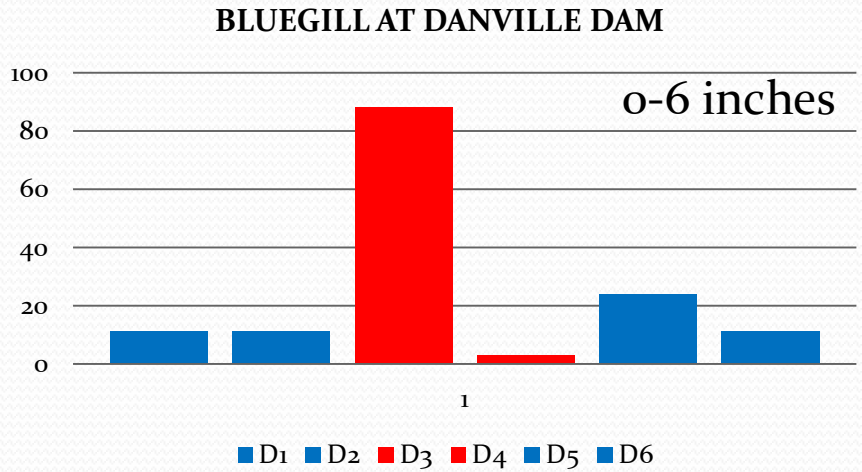


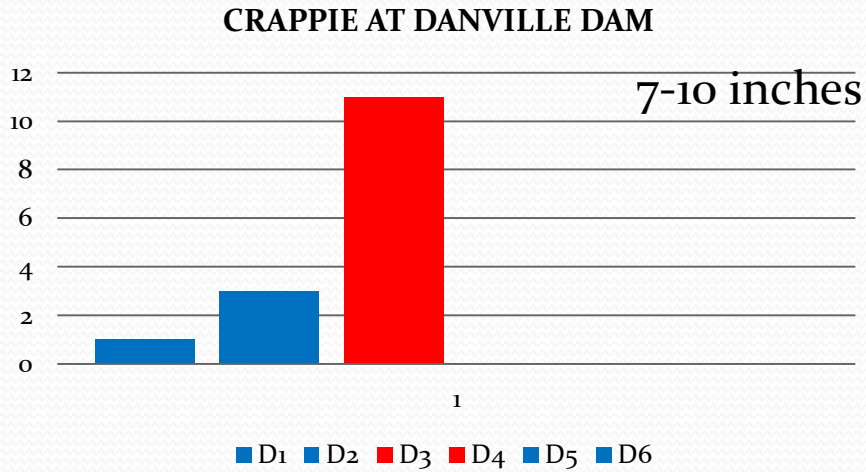


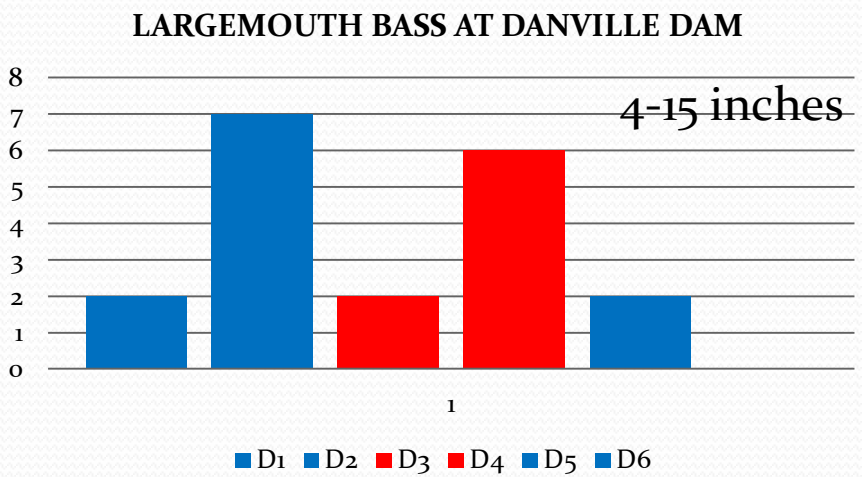


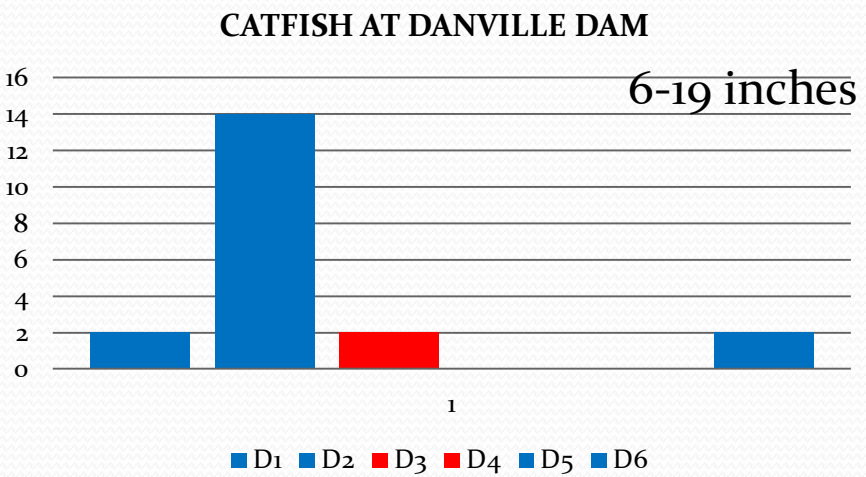
Sportfish Concerns at Danville Dam

EIU Surveys: October 9-15, 2012

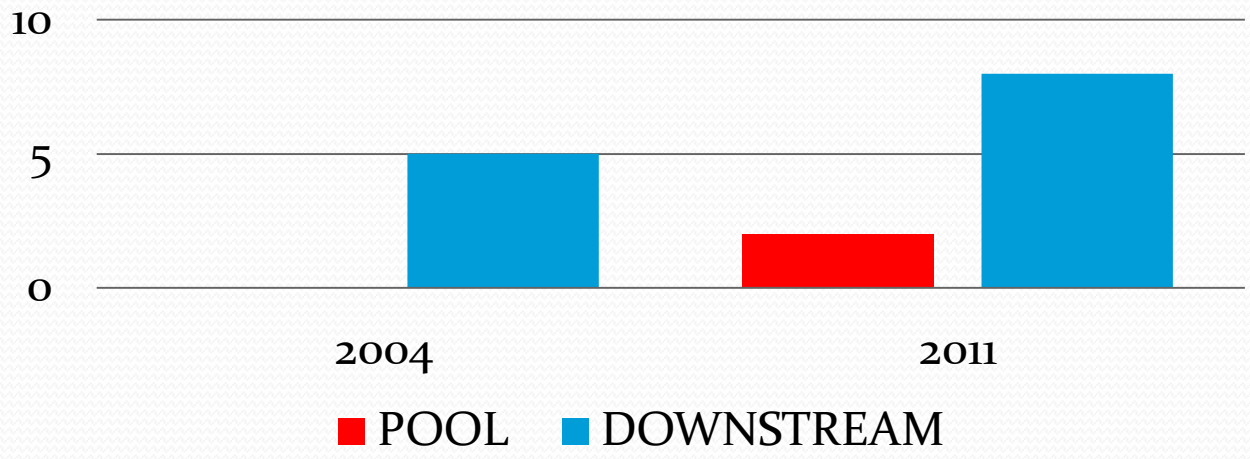


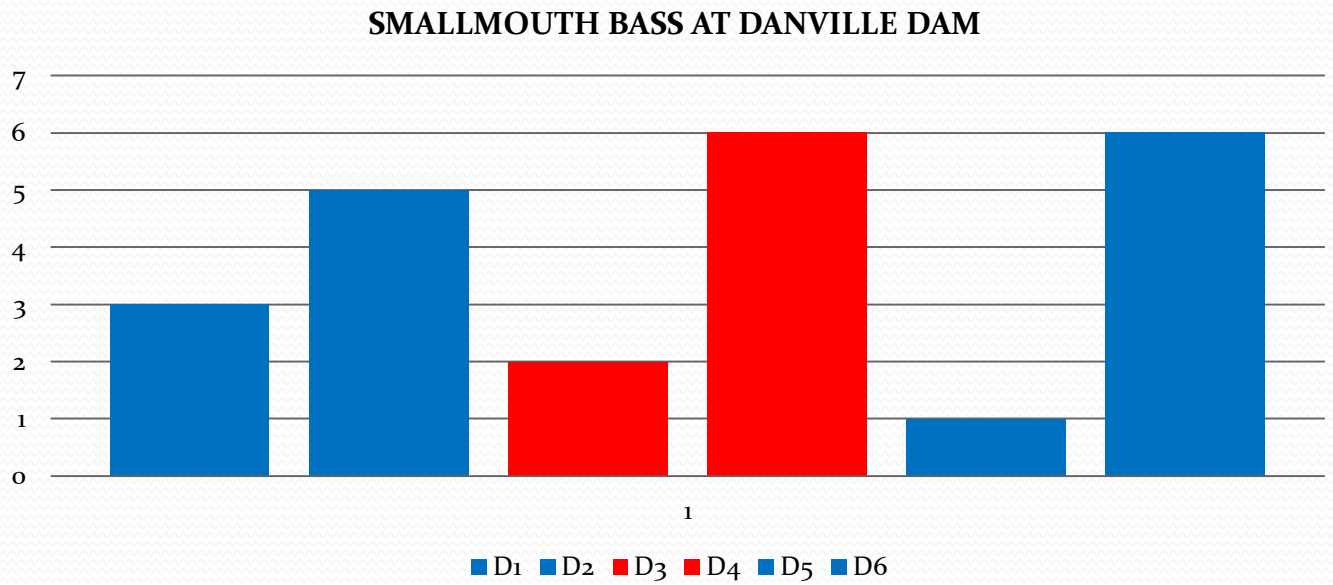




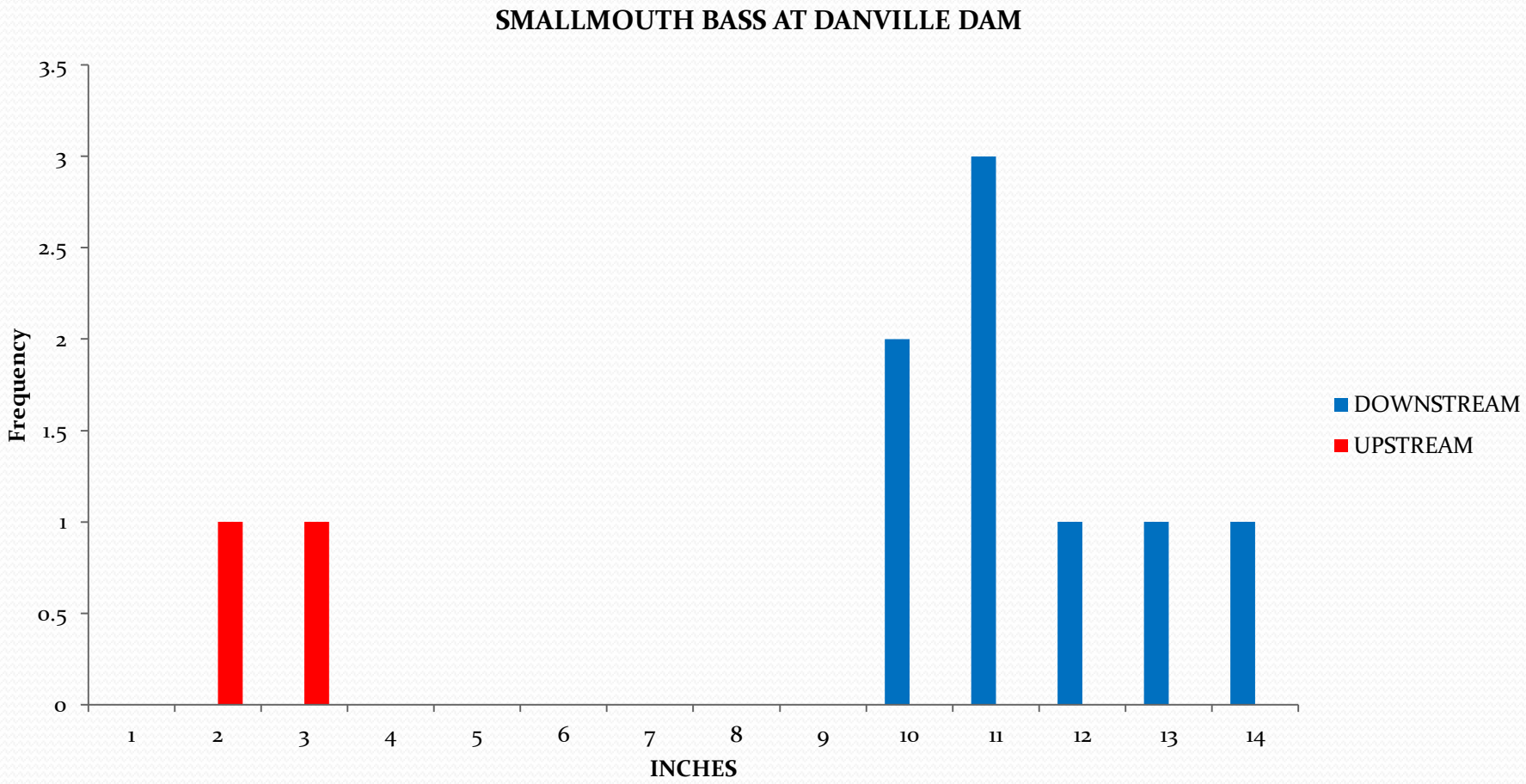


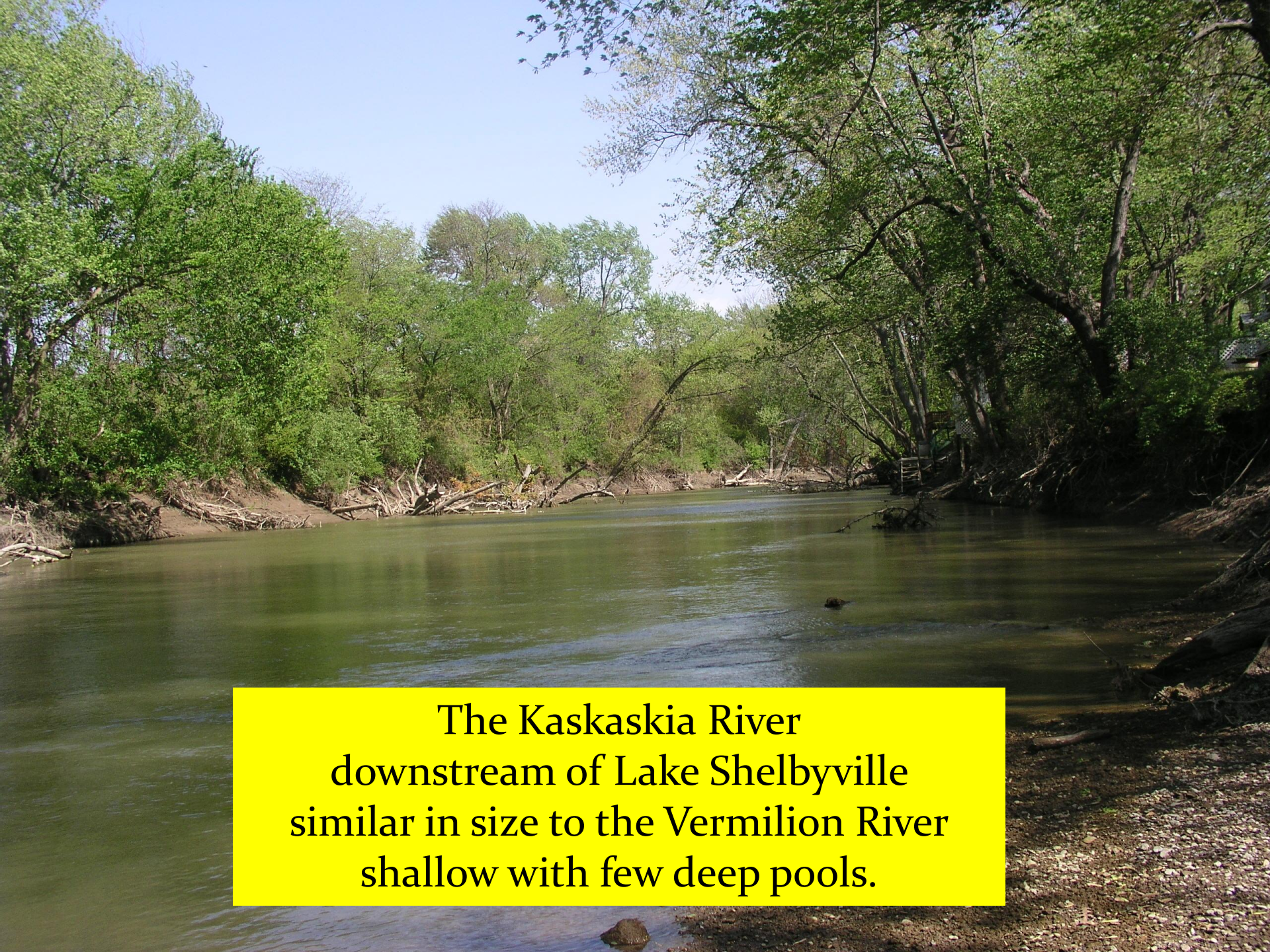
Smallmouth Bass at Danville Dam

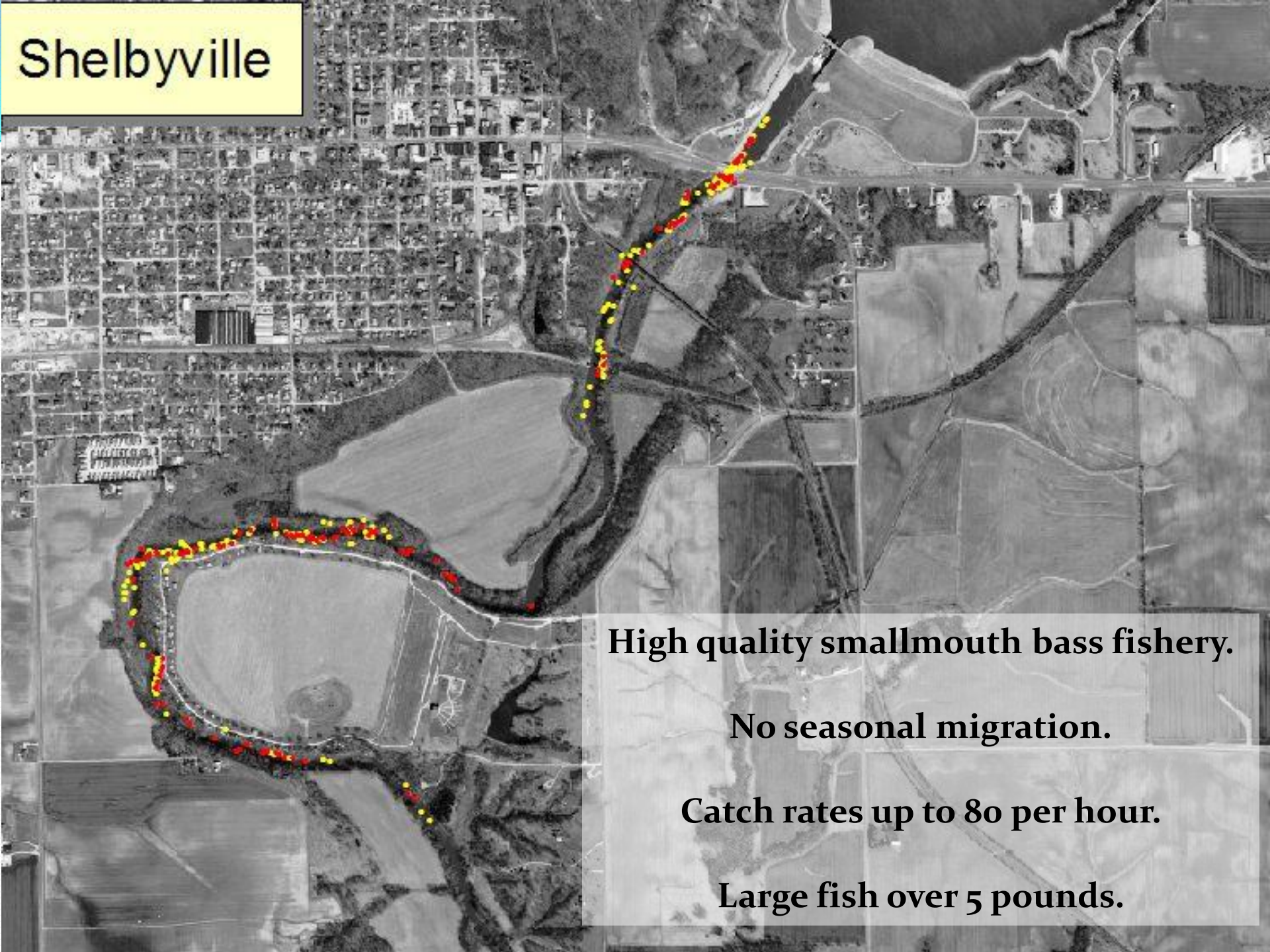




Smallmouth Bass sizes above vs. below the dam




The Kaskaskia River
downstream of Lake Shelbyville
similar in size to the Vermilion River
shallow with few deep pools.



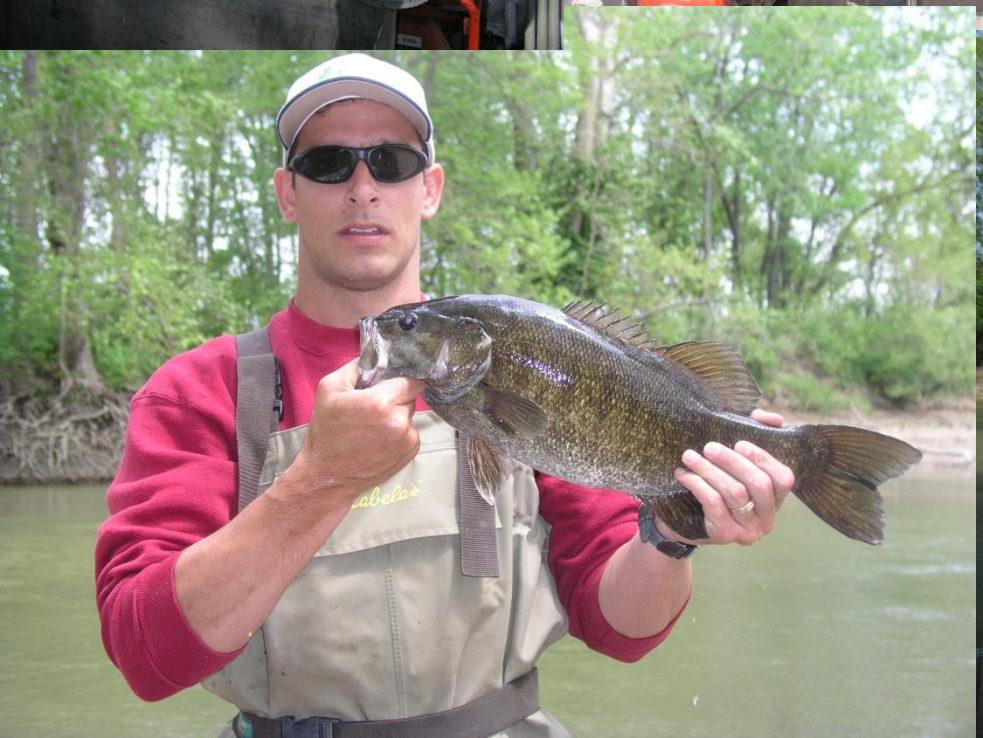
High quality smallmouth bass fishery.

No seasonal migration.

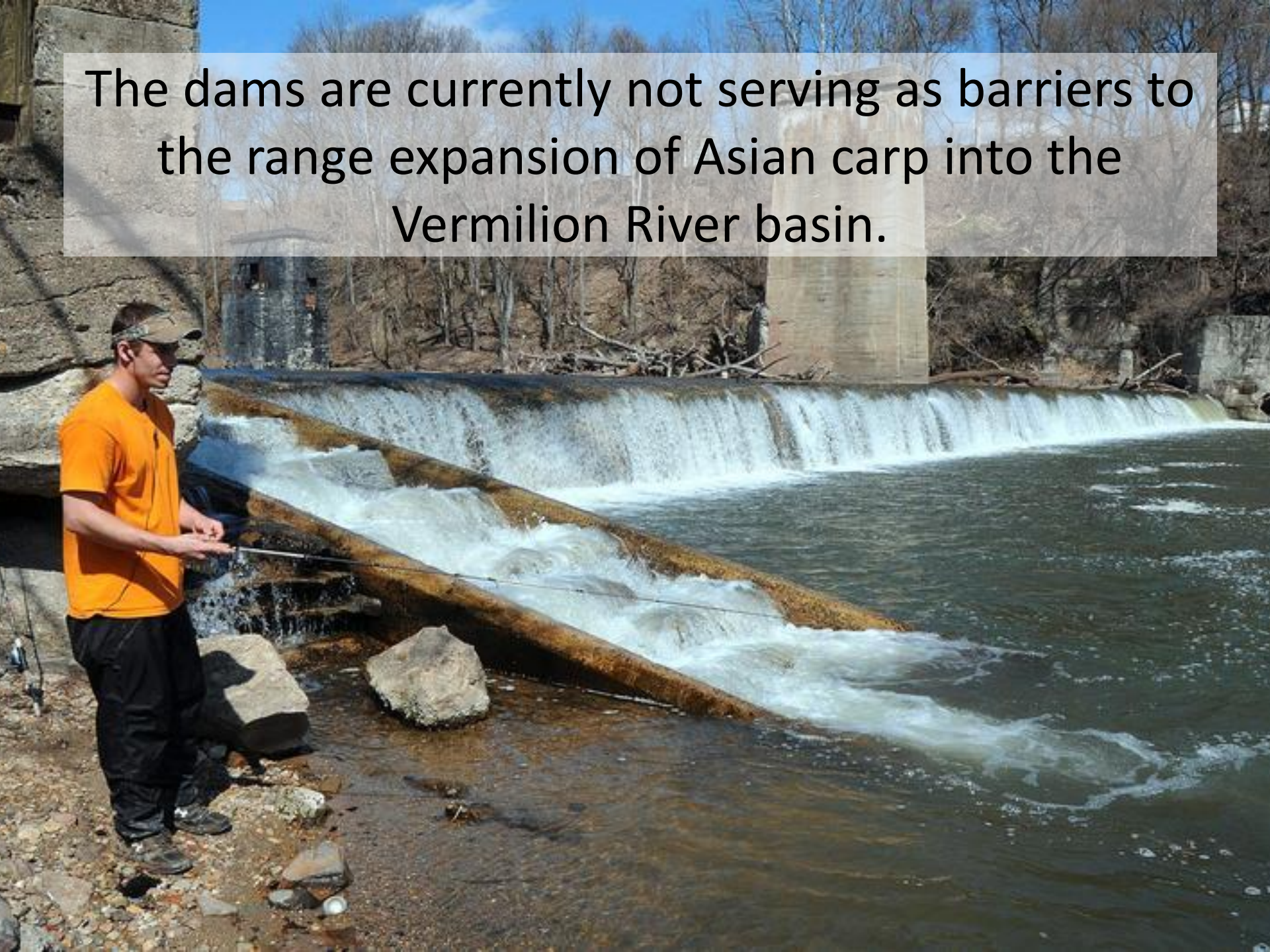
Catch rates up to 80 per hour.

Large fish over 5 pounds.

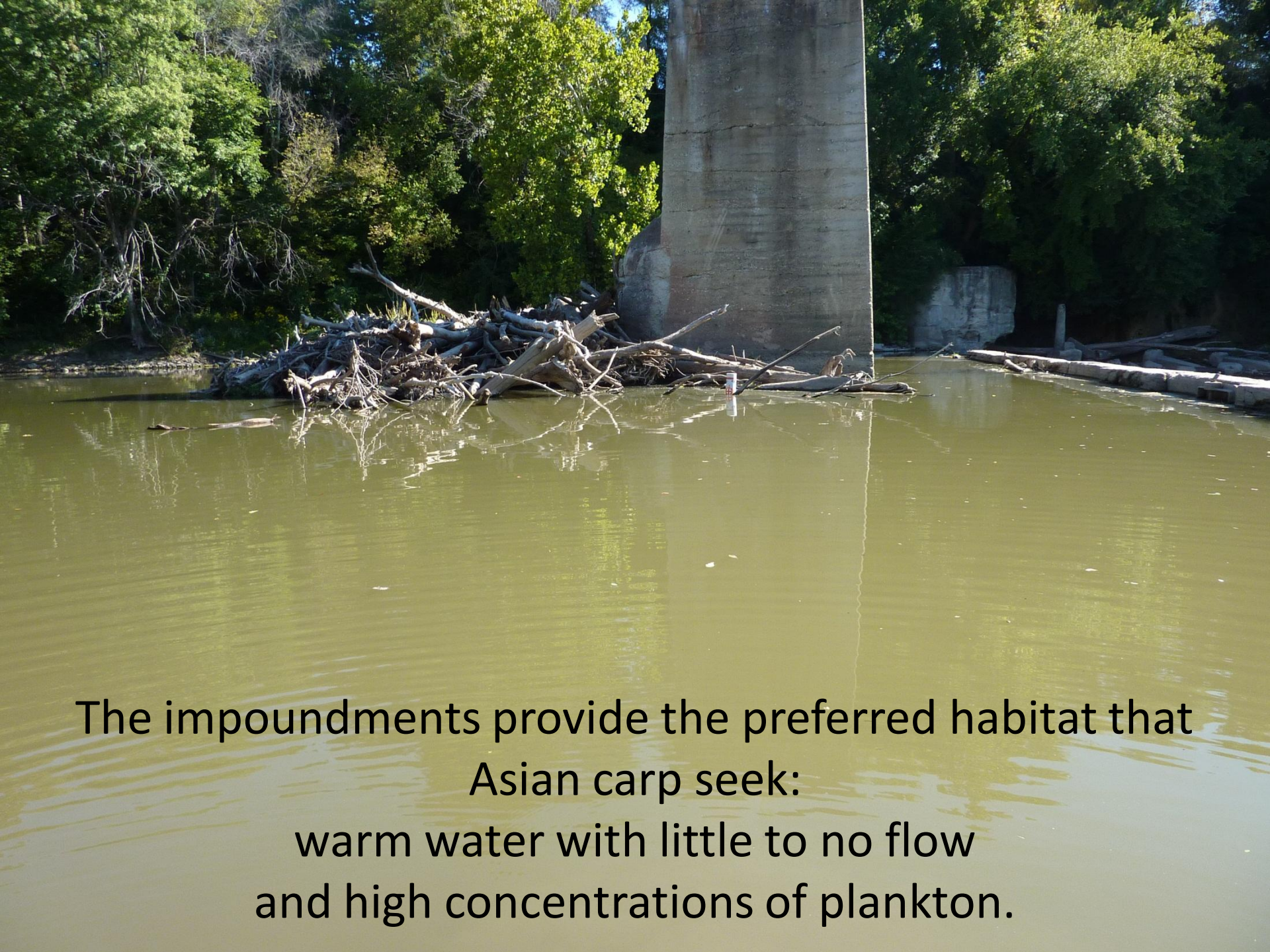



Another concern…Asian carp


The dams are currently not serving as barriers to the range expansion of Asian carp into the Vermilion River basin.


Strong jumping capabilities, as seen here
in a backwater lake of the Illinois River.



The impoundments provide the preferred habitat that Asian carp seek:
warm water with little to no flow
and high concentrations of plankton.

Other Studies on the Removal

- Karl Visser - Hydraulic Engineer, USDA
  - "…clearly shows why these types of dams are so deadly"
  - "Removing the dam will remove public safety hazards and reduce owners maintenance costs."
  - "Removing the dam will change recreational fishing, but the change will be an improvement."
  - "Fish species have flourished in the Baraboo River since four dams were removed"

Visser, K.K. (2005) *"Vermilion River Dam Removal or Modification"*: 2005 ASCE Water Management Conference, July 19-22, pp. 2-10

The State has appropriated funding

- Funding have been appropriated for the removal of 16 dams
- Governor's Dam Removal Initiative of 2012
- Part of Governor Quinn's Jobs Now program

Project Schedule

Spring/Summer 2013 – Report finalized

Unknown – City decision

1 month – Project sponsorship agreement signed

9 months – Permit and Plans completed

3 months – Contractor selection process completed

10 months – Construction

Thank You

Please stay and view the exhibits on display

Submit comments in the comment box or email them to: dnr.dwrm@illinois.gov

<u>Representatives available during the open house</u>

Doug Ahrens – Danville, Director of Public Works

David Schnelle – Danville, City Engineer

Arlan Juhl – IDNR OWR, Director

Rick Gosch – IDNR OWR, Section Manager

Loren Wobig – IDNR OWR, Project Manager

Wes Cattoor – IDNR OWR, Project Engineer

Trent Thomas – IDNR ORC, Fisheries Biologist